

1000 Series Pipe Shredder

Models Covered:
APS, CPS, MPS, EPS, SPS

Part Number: MAN-EPS-0001

Bulletin Number: GRN4-610

Effective: August 1, 2012

Write Down Your Serial Numbers Here For Future Reference:

_____	_____
_____	_____
_____	_____

We are committed to a continuing program of product improvement.
Specifications, appearance, and dimensions described in this manual are subject to change without notice.

DCN No. _____
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Shipping Info

Unpacking and Inspection

You should inspect your granulator for possible shipping damage.

Thoroughly check the equipment for any damage that might have occurred in transit, such as broken or loose wiring and components, loose hardware and mounting screws, etc.

In the Event of Shipping Damage

According to the contract terms and conditions of the Carrier, the responsibility of the Shipper ends at the time and place of shipment.

Notify the transportation company's local agent if you discover damage.

Hold the damaged goods and packing material for the examining agent's inspection. **Do not return any goods before the transportation company's inspection and authorization.**

File a claim with the transportation company. Substantiate the claim by referring to the agent's report. A certified copy of our invoice is available upon request. The original Bill of Lading is attached to our original invoice. If the shipment was prepaid, write us for a receipted transportation bill.

Advise customer service regarding your wish for assistance and to obtain an RMA (return material authorization) number.

If the Shipment is Not Complete

Check the packing list as back-ordered items are noted on the packing list. You should have:

- ☒ Granulator
- ☒ Bill of lading
- ☒ Packing list
- ☒ Operating and Installation packet
- ☒ Electrical schematic and panel layout drawings
- ☒ Component instruction manuals

Re-inspect the container and packing material to see if you missed any smaller items during unpacking.

If the Shipment is Not Correct

If the shipment is not what you ordered, **contact the shipping department immediately**. For immediate assistance, please contact the correct facility located in the technical assistance section of this manual. Have the order number and item number available. *Hold the items until you receive shipping instructions.*

Returns

Do not return any damaged or incorrect items until you receive shipping instructions from the shipping department.

Credit Returns

Prior to the return of any material, **authorization** must be given by **the manufacturer**. A RMA number will be assigned for the equipment to be returned.

Reason for requesting the return must be given.

ALL returned material purchased from **the manufacturer** returned is subject to 15% (\$75.00 minimum) restocking charge.

ALL returns are to be shipped prepaid.

The invoice number and date or purchase order number and date must be supplied.

No credit will be issued for material that is not within the manufacturer's warranty period and/or in new and unused condition, suitable for resale.

Warranty Returns

Prior to the return of any material, authorization must be given by **the manufacturer**. A RMA number will be assigned for the equipment to be returned.

Reason for requesting the return must be given.

All returns are to be shipped prepaid.

The invoice number and date or purchase order number and date must be supplied.

After inspecting the material, a replacement or credit will be given at **the manufacturer's** discretion. If the item is found to be defective in materials or workmanship, and it was manufactured by our company, purchased components are covered under their specific warranty terms.

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Chapter 1: Safety

1-1 How to Use This Manual

Use this manual as a guide and reference for installing, operating, and maintaining your granulator. The purpose is to assist you in applying efficient, proven techniques that enhance equipment productivity.

This manual covers only light corrective maintenance. No other maintenance should be undertaken without first contacting a service engineer.

The Functional Description section outlines models covered, standard features, and safety features. Additional sections within the manual provide instructions for installation, pre-operational procedures, operation, preventive maintenance, and corrective maintenance.

The Installation chapter includes required data for receiving, unpacking, inspecting, and setup of the granulator. We can also provide the assistance of a factory-trained technician to help train your operator(s) for a nominal charge. This section includes instructions, checks, and adjustments that should be followed before commencing with operation of the granulator. These instructions are intended to supplement standard shop procedures performed at shift, daily, and weekly intervals.

The Operation chapter includes a description of electrical and mechanical controls, in addition to information for operating the granulator safely and efficiently.

The Maintenance chapter is intended to serve as a source of detailed assembly and disassembly instructions for those areas of the equipment requiring service. Preventive maintenance sections are included to ensure that your granulator provides excellent, long service.

The Troubleshooting chapter serves as a guide for identification of most common problems. Potential problems are listed, along with possible causes and related solutions.

The Appendix contains technical specifications, drawings, schematics, parts lists, and available options. A spare parts list with part numbers specific to your machine is provided with your shipping paperwork package. Refer to this section for a listing of spare parts for purchase. Have your serial number and model number ready when ordering.

Safety Symbols Used in this Manual

The following safety alert symbols are used to alert you to potential personal injury hazards. Obey all safety messages that follow these symbols to avoid possible injury or death.



DANGER indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.















WARNING indicates a potentially hazardous situation or practice that, if not avoided, could result in death or serious injury.



CAUTION indicates a potentially hazardous situation or practice that, if not avoided, may result in minor or moderate injury or in property damage.

Figure 1: Safety Tags and warning features

Hazard Alert Symbol	Description/Explanation	Preventative Maintenance
	High Voltage Hazard. The electrical enclosure is supplied with 3-phase electrical power. Use caution when using or maintaining this product.	Every six months inspect all electrical connections for secure attachment. For further information see the Maintenance Chapter in this manual
	Hands could be exposed to a crushing movement.	Every month inspect the shears/blades for any type of wear. For further information see the Maintenance Chapter in this manual.
	When equipped with belts and sheaves, hands could become entangled.	Every month inspect the belt(s) for any type of wear. For further information see the Maintenance Chapter in this manual.
	Hands can become entangled or cut if they enter the danger zone of gears or cutting shears	Every month inspect the shears/blades for any type of wear. For further information see the Maintenance Chapter in this manual.
	The unit can produce continuous noise above 85 dBA and/or produce projectiles under normal operating conditions.	Always wear eye and ear protection when the machine is in operation or performing maintenance.
	A person could be exposed to a crushing movement if walking around or under machine that is open/suspended for moving.	Always be aware of your surroundings and do not walk underneath a suspended machine.

Mandatory Symbol	Description/Explanation
	Read Operators Manual. This equipment must be operated and maintained by properly trained personnel. The information contained within this manual must be read and understood prior to operating this equipment.
	Lock Out. This equipment is operated with 3-phase electrical power. Therefore, when performing any maintenance operations we recommend following the local standards for performing a lock-out/tag-out procedure.
	Wear Safety Gloves. This equipment operates with sharp blades and rotors. We recommend that technicians use safety gloves while performing maintenance to protect hands from being exposed to these sharp surfaces.
	Wear ear and eye protection. This unit may produce loud and continuous noise and may produce projectiles.
	Pneumatic or hydraulic equipment. Pneumatic or hydraulic equipment must be kept at a safe pressure.
	Do not reach into unit. Reaching into a unit is prohibited while the unit is in operation and may cause serious injury.

General Safety Regulations

This machine uses knives for the performance of its intended use. Consequently, it can be a dangerous machine to operate and maintain unless these safety regulations are followed.

These regulations should be read, understood and periodically reviewed by all personnel involved in any way with this machine.

Never operate or remove any machine components that are secured by wrench-type fasteners unless the motor is electrically locked out and the rotor is motionless.

Never operate the machine or jog the rotor unless the cutting chamber covers, discharge chute, or any guards or covers are in place and secure. Do not circumvent the safety interlocks.

Prior to clearing a jam or performing any maintenance, the motor should be turned off and electrically locked out. Be sure that the rotor has come to a stop. Hands must not be inserted into the machine to clear the jam.

Do not extend any part of the body into feed roll openings or discharge area unless the motors are electrically locked out and the rotor and feed rolls are motionless.

Never extend fingers through holes in screen.

Be sure that the v-belts are properly aligned and that tension is at its maximum.

Extreme care should be taken to see that all bolts are properly tightened at all times. During the operation of the machine, rotor knife bolts may come loose. Although fine threads are used on the rotor knife bolts because vibration does not easily loosen them, you should inspect the tightness of the bolts frequently.

This machine is designed for the granulation of plastic materials. Do not feed any other materials into the machine.

1-2 Responsibility

These machines are constructed for maximum operator safety when used under standard operating conditions and when recommended instructions are followed in the maintenance and operation of the machine.

All personnel engaged in the use of the machine should become familiar with its operation as described in this manual.

Proper operation of the machine promotes safety for the operator and all workers in its vicinity.

Becoming familiar with materials, inspection, speed limitations, screens, and guard maintenance and total user responsibility will assist you in learning potential areas in need of observation for danger.

Each individual must take responsibility for observing the prescribed safety rules as outlined. All caution, warning and danger signs must be observed and obeyed. All actual or potential danger areas must be reported to your immediate supervisor.

1-3 Warnings and Precautions

Our granulators are designed to provide safe and reliable operation when installed and operated within design specifications, following national and local safety codes.

To avoid possible personal injury or equipment damage when installing, operating, or maintaining this granulator, use good judgment and follow these safe practices:

- ☑ **LEARN AND OBEY** your company's safety policy regarding granulating equipment.
- ☑ **MOVING OR LIFTING THE GRANULATOR:** Although our equipment is built and engineered for great ruggedness in operation, care must be taken when moving the machine along the floor or lifting it. Damage may occur to sheet metal covers, electrical cabinets, or small brackets if pressure is applied to them when moving the granulator. When lifting the granulator, be certain of total machine weight and the capability of the lifting equipment. (See the Granulator Specification Sheets for machine weights and dimensions.)
- ☑ **GRANULATOR LOCATION:** Adequate area for routine maintenance should be provided in order to open the machine for knife, screen, or cleanout service. Proper service area clearances also should allow people who are working on the machine to be clearly visible to others, thereby reducing the potential safety hazards.
- ☑ **SAFE HOUSEKEEPING:** The work area must be kept clean and uncluttered during periods of operation or maintenance. No hand tools or other metal objects should be left on or around the machine. Any tools or other metal objects that mistakenly fall into the hopper feed opening can cause severe damage to internal cutting chamber, rotor and screen components.
- ☑ **SAFETY GLASSES OR A FACE SHIELD MUST ALWAYS BE WORN** when servicing or operating the machine. Although our machines are designed for the maximum in flyback control, caution must be used when operating near the hopper feed opening in order to guard against unexpected material flyback.
- ☑ **EAR PROTECTION** may be required when operating the machine during granulation of very hard or noisy materials. The Occupational Safety and Health Act of 1970 has established guidelines for Permissible Noise Exposures (OSHA 1910.95) that should be followed.
- ☑ **NEVER** attempt to operate the granulator unless it is fully assembled with all guards and interlocks in place and functional.
- ☑ **OBSERVE** all danger, warning, caution and safety labels on the equipment.
- ☑ Upon completion of any machine maintenance, be certain **ALL SAFETY GUARDS AND COVERS** are securely and properly fastened prior to resuming machine operation. All fasteners must be in place and properly tightened. **ANY SHORTCUTS MAY RESULT IN INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT.**
- ☑ **NEVER** wear any loose fitting clothes, neckties, or dangling items such as earrings, belts, or shoestrings. Jewelry, such as wristwatches, bracelets, or rings should **NEVER** be worn. Long hair must be tied back or placed in a tight fitting hairnet. **NEVER** lean against or rest hands or feet on the granulator when it is in operation or open for maintenance. **NEVER** stand on the granulator when it is in operation.





- ☑ **ROTATION OF MOTORS:** The correct rotating direction for the granulator motor is clearly marked on the machine. Always check for proper rotation of motors. Incorrect rotation direction can cause severe damage.
- ☑ **ELECTRICAL GROUNDING:** All electrical equipment on the granulator must be grounded in accordance to all local codes and Article 250 of the National Electric Code.
- ☑ **ALWAYS DISCONNECT AND LOCKOUT** the main electrical power to the granulator before performing any service.
- ☑ **SAFETY INTERLOCKS MUST NOT BE BYPASSED.** The mechanical and electrical safety interlocks ensure the safety of personnel. They should never be tampered with or removed for ANY reason. They should be checked frequently by a qualified mechanic for proper operation.
- ☑ **NEVER** modify the machine configuration or any individual component without written notice from the factory.

Remaining Risks

The machine is constructed so that you are able to operate it safely. Non-avoidable dangers are prevented as greatly as possible by the protective devices. Remaining risks always exist. Please be aware of the risks described below as this will help operators/staff avoid accidents. To further avoid danger, please adhere to all advice provided in the operational manual.

Mechanical Dangers

Type of Danger	Activity	Possible Consequences	Preventative Measures
Crushing due to heavy parts falling down or over.	Unloading/transporting the machine and/or components.	Serious injury.	<ul style="list-style-type: none">• Wear personal protective gear and follow the instructions provided in the operational manual.
Cutting caused by sharp knives—even when the rotor is stationary.	Knife replacement, knife setting, knife sharpening, and other maintenance.	Serious injury—particularly to the hands and fingers.	<ul style="list-style-type: none">• Wear personal protective gear and follow the instructions provided in the operational manual.
Crushing when opening/closing the doors on front side of machine.	Maintenance.	Serious injury.	<ul style="list-style-type: none">• Ensure no persons are in the danger area while closing the door.
Tripping over cables and other surrounding objects.	All activities.	Serious injury.	<ul style="list-style-type: none">• Lay cables in accordance with regulations.• Keep work station clean and tidy.
Crushing, cutting, amputation caused by run-down of the rotor.	Maintenance.	Serious injury or death.	<ul style="list-style-type: none">• The maintenance doors must always be tightly locked during operation.• DO NOT make the run-down safety devices ineffective by using technical aids or other manipulations.• NEVER use hands to check if the rotor has stopped.

Type of Danger	Activity	Possible Consequences	• Preventative Measures
Direct/indirect contact with live parts in terminal box.	Maintenance; start-up.	Serious injury or death.	<ul style="list-style-type: none"> • Only trained electricians may carry out work on the electrical equipment. • If work is necessary on parts that could conduct dangerous voltage, a second person should be present to break the power supply in case of an emergency. • The yellow-marked lines conduct voltage even when the machine is switched OFF. • Only use original safety fuses with stipulated intensity of current. • Faulty electrical components must be replaced immediately. • If faults occur in electrical energy supply, switch the machine OFF immediately. • The terminal box must be locked during operation. Before opening the terminal box turn main switch to 0.
Failure of the Emergency Stop Function.	All activities.	Serious injury or death.	<ul style="list-style-type: none"> • There must be a guarantee that the machine will be stopped immediately upon failure of an Emergency Stop button.
Fire/explosion caused by throwing dangerous objects (i.e. spray cans) into the shredder.	Grinding.	Serious injury or death.	<ul style="list-style-type: none"> • Only grind material that corresponds to the agreed customer-specific specifications.
Damage to hearing.	All activities.	Diminished hearing, headaches, impaired balance, and deterioration of concentration.	<ul style="list-style-type: none"> • Reduce noise levels by taking suitable measures and wear ear protection.
Instable machine due to vibration.	All activities.	Serious injury.	<ul style="list-style-type: none"> • Install the machine according to the instructions in the operational manual.
Loose cutter/bed knife mountings due to vibration.	All activities.	Serious injury.	<ul style="list-style-type: none"> • Check the cutter/bed knife mountings regularly.
Inhalation of grinding dust.	All activities.	Respirator disease, etc.	<ul style="list-style-type: none"> • Mount a suitable air suction device. DO NOT blow out grinding dust when cleaning the machine.
Crushing, cutting, amputation caused by manipulation of protective devices.	All activities.	Serious injury or death.	<ul style="list-style-type: none"> • Never make the protective devices ineffective; check the devices regularly for proper function.

For further information on granulator safety, installation, and operation, see the *American National Standard for Plastics Machinery—Granulators, Pelletizers, and Dicers Used for Size Reduction of Plastics—Construction, Care, and Use*. ANSI B151.11-1982.

We have long recognized the importance of safety and have designed and manufactured our equipment with operator safety as a prime consideration. We expect you, as a user, to abide by the foregoing recommendations in order to make operator safety a reality.

Chapter 2: Functional Description

2-1 Models Covered in This Manual

This manual covers the 1000 Series pipe shredder which includes models APS, CPS, MPS, EPS and SPS. The 1000 Series pipe shredder is designed for size-reduction of plastic pipes made of PE, PP, and PVC etc. The user is responsible for consequences resulting from incorrect operation: This will lead to the loss of the warranty as well as any compensation claims.

2-2 General Description & Typical Features

Mechanical section

After the machine has been switched on, a hydraulically controlled feeding unit pushes the pipe onto the slow-running rotor. The in feed is controlled according to the load of the motor.

The pipes can be fed horizontally and without precutting into the feeding trough of the pipe shredder by a forklift or optionally with a loading device. The feeding trough has a hydraulically operated cover, which is closed after it is filled with material. A hydraulic ram system is then pushing the material towards the rotor. The ram consists of a double-acting telescopic cylinder and the pusher itself, which is a heavy durable welding construction. The pusher is moving on 3 sets of high performance guide roller skids. Those adjustable skids are running on 3 independent guide rails. The trough is built with tough steel profiles and all safety features are according latest CE-standards for work safety. The pipe should be placed horizontally in the feeding trough mounted next to the cutting chamber. Attention must be paid that this material does not contain any metal parts. The guarantee does not cover any damage to the machine as a result of metal parts being fed into the machine. The pipe in the feeding trough is shredded by the rotating knives on the rotor. This shredding process is finished when the hydraulic cylinder has reached its full stroke and the pusher is at the end position. The 1000 series shredder is equipped with an E style rotor using a standard square, concave cutter blocks. These cutters make light work of the heaviest pieces. Importantly, the design allows efficient cutting of material, rather than hammering as well as reduced heat build-up and degradation of material. The cutter blocks have four corners so they can be easily turned once a corner has worn away. The projection of the cutter can be easily adjusted to match the aggressiveness of the shredder with the customer's material by adding or removing thin shims on the cutters holder. The housing is a rigid welded and very compact construction. Upper and lower part of the housing are bolted together and this makes maintenance work very convenient. The housing is sitting on a base frame, which allows easy installation of a discharge conveyor.

Due to the compact design this machine can only be used for screen-less operations! The heavy-duty outboard bearings mounted on the 1000 series shredders minimize the risk of contamination of the recycled materials and also minimize the risk of dust penetrating the bearings and make a rotor change easier. Power is transmitted from the electromotor by V-belts to the gearboxes, which are mounted directly on the shaft end on either side of the rotor. In combination with the elastically supported torque arm this construction will reduce stress to both motor and gear. The dual drive will further ensure that all loads are evenly distributed into the rotor.

Control

The pusher feeds the rotor with as much material as it is able to process. Upon reaching 70-90 % of rated current, the feeding of the pusher will be stopped and automatically started again after the power consumption has fallen by 20 % in comparison with rated current. If the high current is applied for longer than 0.7 - 1.5 sec., the main drive motor switches off and runs back after about 3 sec. standstill time. The pusher plate also runs back whilst the rotor runs back. The drive motor then stops for another 3 sec. before starting again. The position of the pusher is controlled by an optical distance sensor. The in feed is controlled according to load. Duration of pauses and return as well as the current settings can be adjusted. Any alterations, however, should only be carried out after consulting the manufacturer.

Grinding Material In-feed

The grinding material can be fed into the shredder using the following methods:

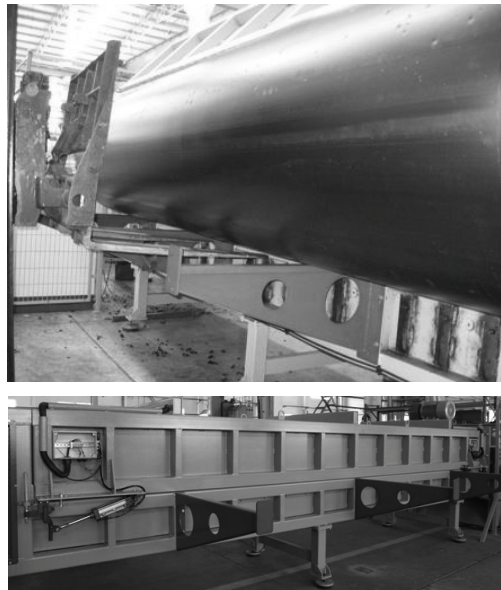
- Manual in-feed of the grinding material directly into the feeding trough.
- Manual in-feed of the grinding material with the help of an additional in-feed device (i.e. hydraulic feeding unit).

In-feed Hopper

The grinding material in-feed ensues via a feeding trough. The pipe can be placed easily in the feeding trough by a forklift.

Illustration:

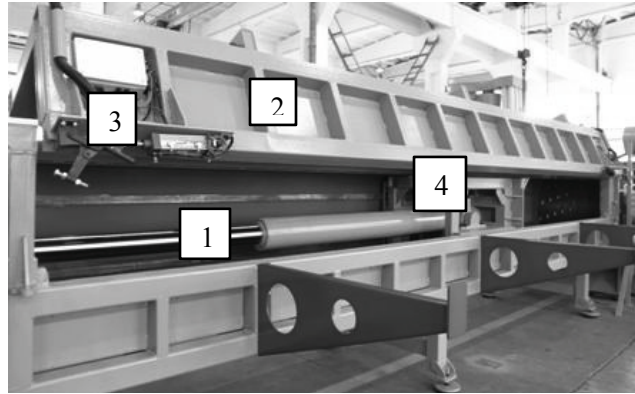
Feeding trough



The feeding trough has a hydraulically operated cover, which is closed after it is filled with material.
A hydraulic ram system is then pushing the material towards the rotor.

Illustration:

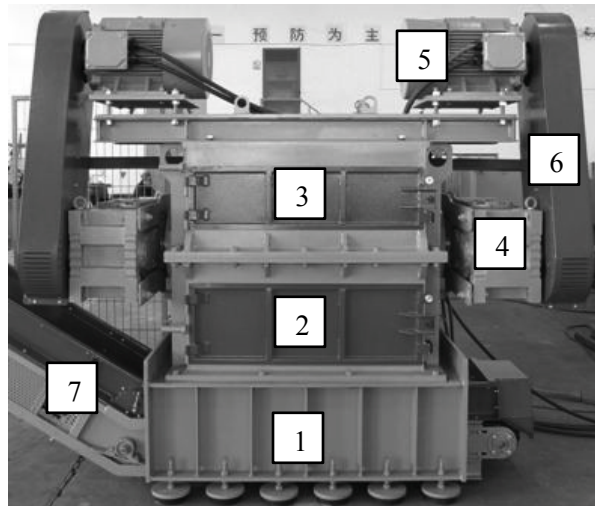
- (1) Stage cylinder
- (2) Cover
- (3) Lock
- (4) Pusher



Optional (not included in standard machine) the feeding trough can be equipped with a hydraulic feeding device.

Illustration:

- (1) Base frame
- (2) Lower housing flap
- (3) Upper housing flap
- (4) Gear box
- (5) Drive motor
- (6) V-belt protection
- (7) Discharge conveyor



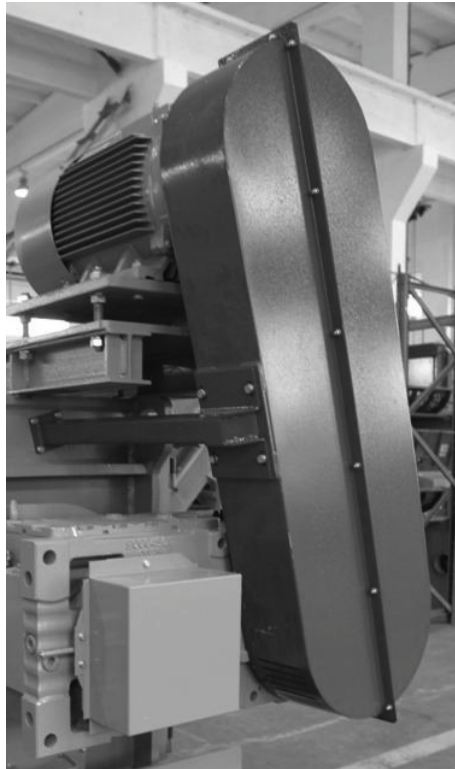
The machine housing is mounted on the base frame and the drive motor and the gear box are mounted on the machine housing. This design makes the machine compact.

Drive

The drive of the rotor ensues by means of an electric motor via "V"-belts. The motor, which is mounted on sliding rails or a motor plate, can be adjusted for regulating the tension of the "V"-belts by means of tensioning screws. The "V"-belt pulley is attached with a special tensioning element to the motor shaft.

Illustration:

Drive



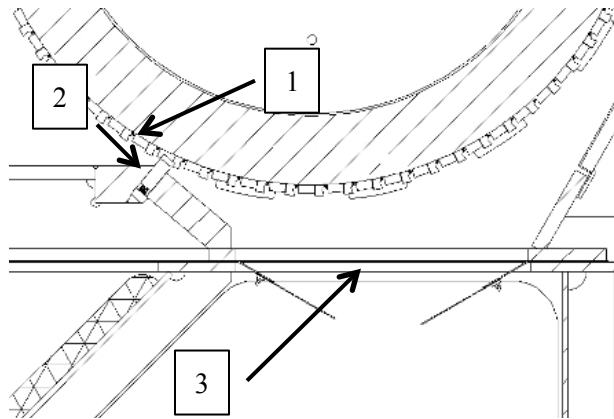
Please observe the operation manual from the manufacturer!

Rotor and Cutters

The material is ground between the knives assembled on the rotor and the stator knives which are mounted in a fixed position in the machine lower section. All rotors are equipped with square knives. These knives make light work of the heaviest pieces. The knives have four corners, so that they can be easily turned once a corner has worn off. The design of the rotor has a significant influence on the quality of the grinding process and its results. The rotor construction, the type of knife mounting and the number of knives have all been exactly matched to your task allocation.

Illustration:

- (1) Rotor knife
- (2) Stator knife
- (3) Discharge area



Due to the compact design this machine can only be used for screen-less operations! The rotor is accessible after opening the lower housing flap or the upper housing flap. The rotor is arranged on roller bearings, which are situated outside the housing. The "V"-belt pulley is attached by means of a taper bush to the rotor axis. The rotor is dynamically counter balanced and has vibration-free concentricity.

Discharge of grinding material

Illustration:

Conveyor belt discharge



The ground material will be discharged by a conveyor belt.

Hydraulic pusher

The ram consists of a double-acting telescopic cylinder and the pusher itself, which is a heavy durable welding construction. The pusher is moving on 3 sets of high performance guide roller skids. Those adjustable skids are running on 3 independent guide rails. The position of the pusher is controlled by an optical distance sensor.

Illustration:

- (1) Hydraulic stage cylinder
- (2) Guide roller
- (3) Guide rail
- (4) Pusher

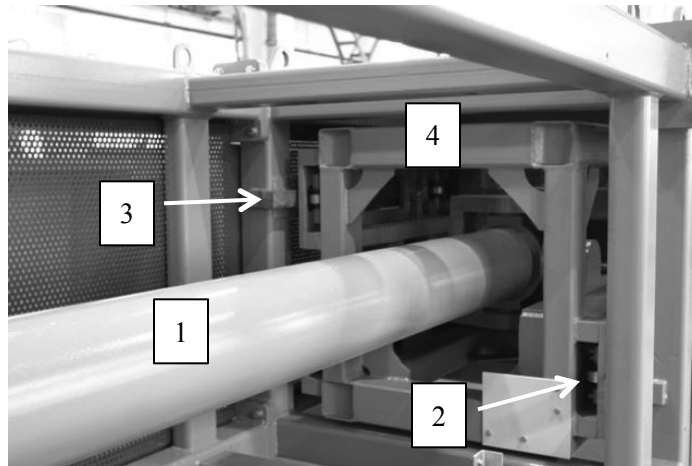


Illustration:

- (1) Pusher front plate
- (2) Guide rail

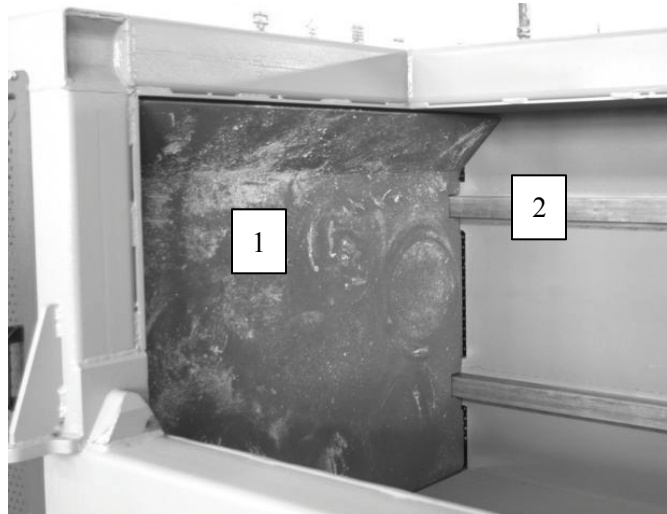
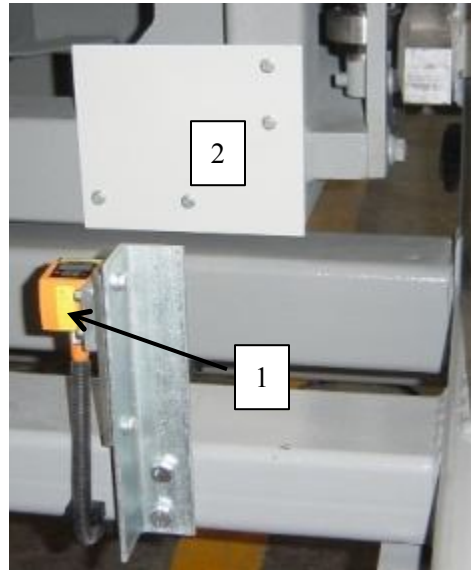


Illustration:

- (1) Distance sensor
- (2) Reflecting area



Control Panel

Illustration:
Control panel

- (1) Emergency STOP
- (2) Ampere meters
- (3) Elapsed hour counter
- (4) Part 1
- (5) Part 2

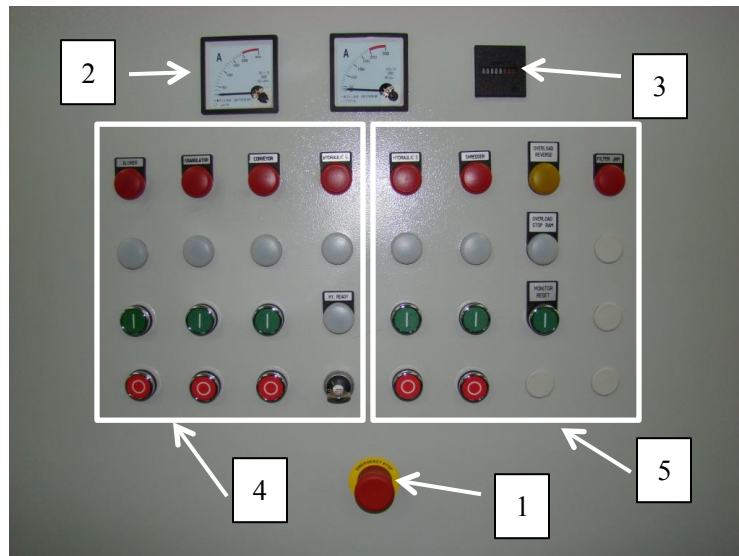


Illustration:
Part 1

- (1) Error lights
- (2) Control lights
- (3) Start buttons
- (4) Stop buttons
- (5) Control light hydraulic
- (6) Start/Stop switch hydraulic

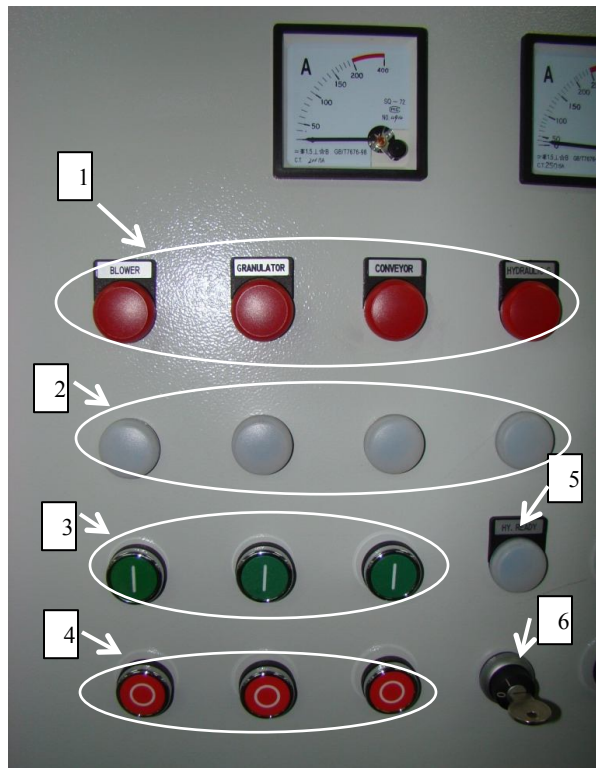
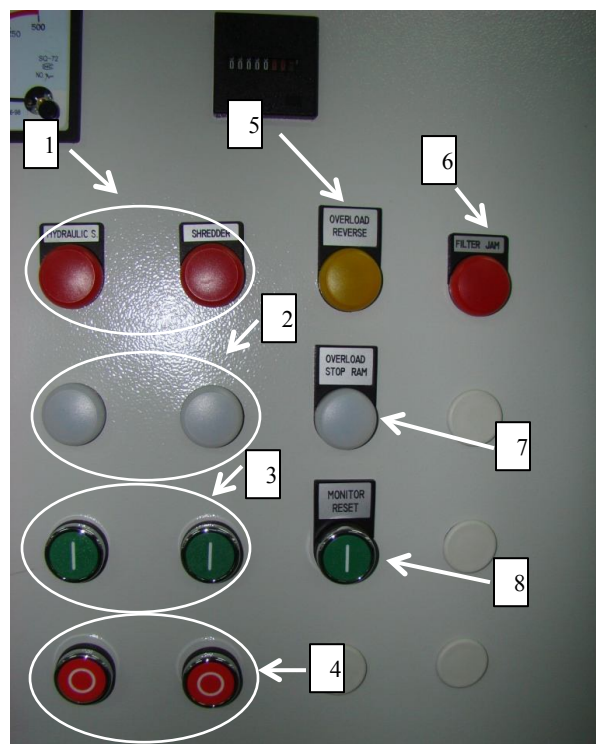


Illustration:
Part 2

- (1) Error lights
- (2) Control lights
- (3) Start buttons
- (4) Stop buttons
- (5) Overload light shredder
- (6) Oil filter jam
- (7) Overload light Ram
- (8) Reset



Operator panel

Illustration:
Control panel

- (1) Part 1
- (2) Part 2
- (3) HMI operator panel
- (4) Emergency STOP

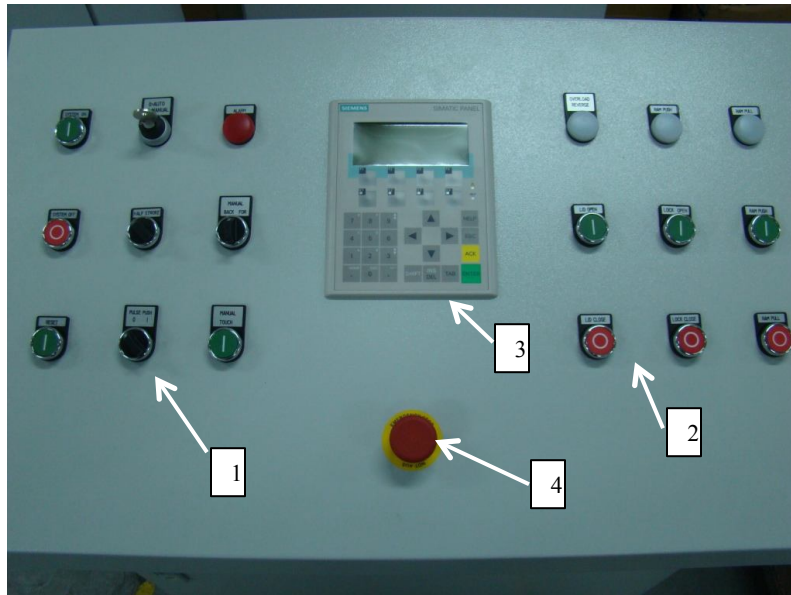


Illustration:
Part 1

- (1) System ON
- (2) Automatic/Manual switch
- (3) Error light Ram
- (4) System OFF
- (5) Half stroke
- (6) Manual rotor move
- (7) Reset
- (8) Pulse-push switch
- (9) Manual push button for Rotor move

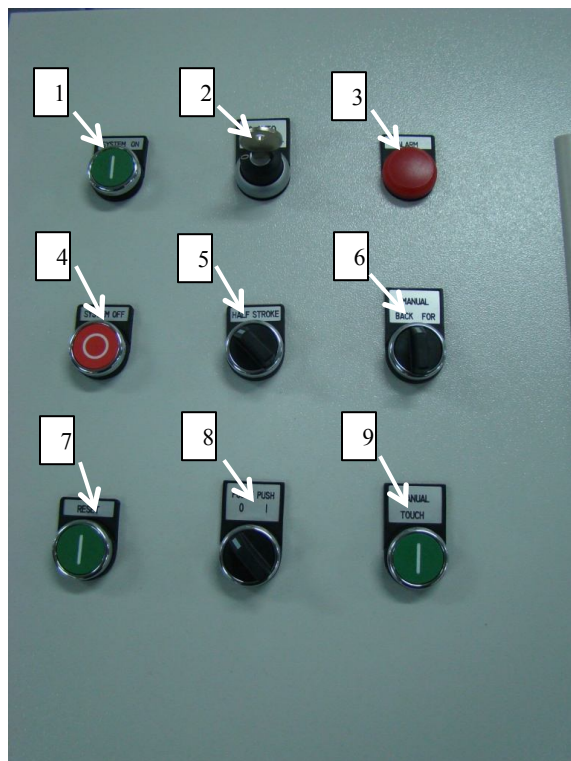


Illustration:
Part 2

- (1) Control light Overload reverse
- (2) Control light Ram PUSH
- (3) Control light Ram PULL
- (4) Lid open
- (5) Lock open
- (6) Ram PUSH
- (7) Lid close
- (8) Lock close
- (9) Ram PULL

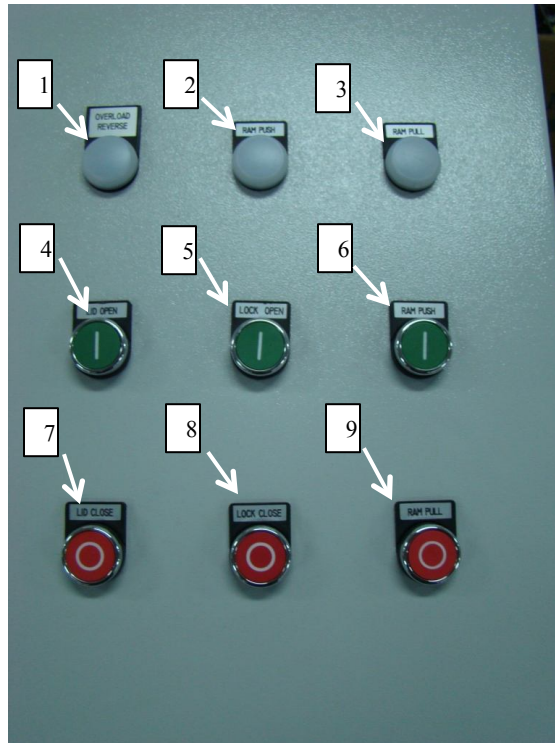


Illustration:

HMI operator panel

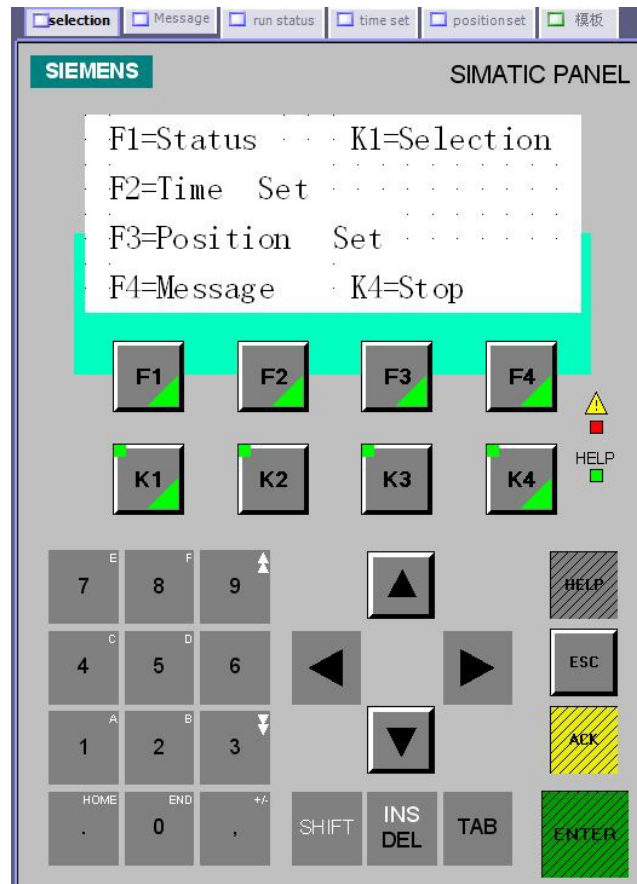


Machine HMI operation manual

Start menu

Illustration:

Operation panel start menu



You can select the second menu what you want to read.

F1: ram running status,

F2: the timer what you want to modify when you operate this machine,

F3: the ram position where you want to modify,

F4: alarm information,

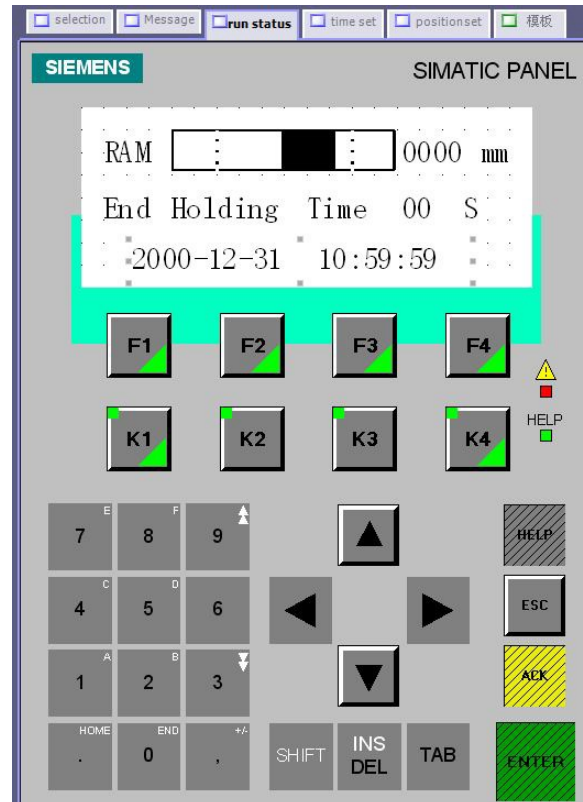
K1: go back to start menu,

K4: stop HMI

Machine running status

Illustration:

Operation panel running status

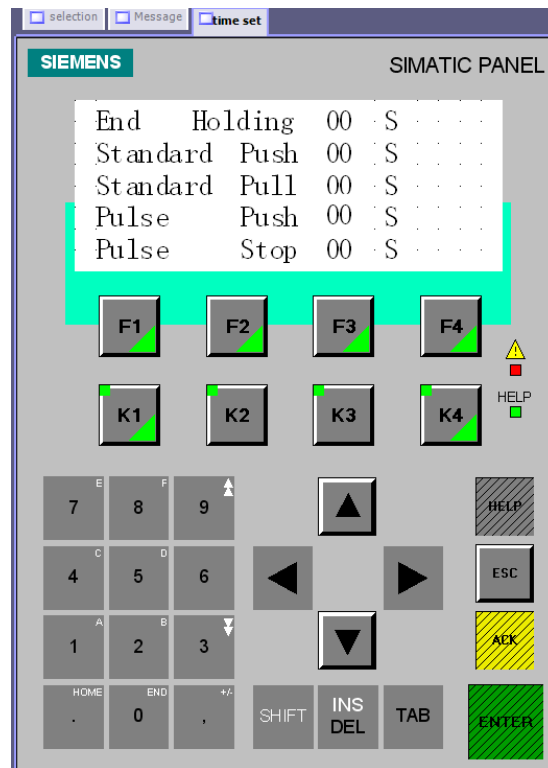


You can read the ram position when the machine running.
End holding time: When the ram reach end position, it will has 20 seconds delay, this time could be modified

Time setting menu

Illustration:

Operation panel time setting menu



End holding: the ram reaches end position and delay time

Standard push: When the ram pushes, this action lasts 30 seconds and then will have a 1 second pull action. So the 30 seconds is standard push time and the 1 second is standard pull.

Standard pull: See above.

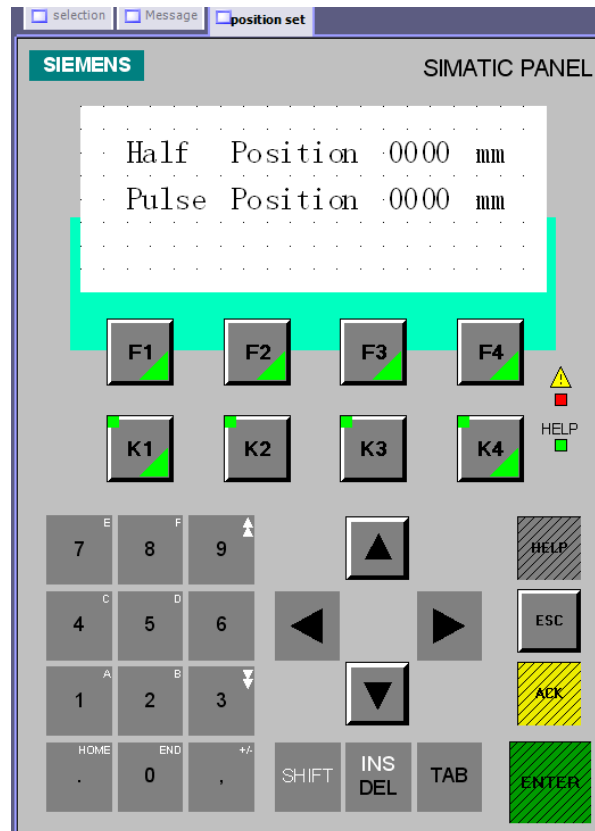
Pulse push: When the ram moves to 700mm point before end position, it will act as this rule, pushes 3 seconds and stop 1 second, so the 3 seconds is pulse push and 1 second is pulse stop.

Pulse stop: See above.

Position setting menu

Illustration:

Operation panel
position setting menu



Half position: the whole length of ram stroke is 7200mm, our setting is 3600mm, but it could be modified. Pulse position: to avoid current peak and motor overload, this setting is 6700mm, it could be modified.

Information menu

Illustration:

Operation panel
position setting menu



You can read information when the machine has alarm or stops automatically.

When machine has 3 times overload in 2 minutes or 3 times hydraulic overload in 2 minutes, rotor will stop running automatically, and also has a message on the HMI, meanwhile the red LED will flash. Press down “ACK” which on the HMI at first, use up and down moves the wire frame to “reset”, then press “ENTER” button, the ram will goes back to start position, and the cover will open, after that could restart the machine again.

Pulse/Push function

In normal process mode the pusher pushes forward continuously till the pusher arm reaches the proximity switch which reverses the function and the pusher moves backwards. By changing the switch (9) to “Pulse push” function on the main control board the pusher moves forward in steps. This means, after each step the pusher remains in his position for a small while before it moves forward again. This function should be used for very heavy applications and in case of danger to overload the system

2-3 Safety Features

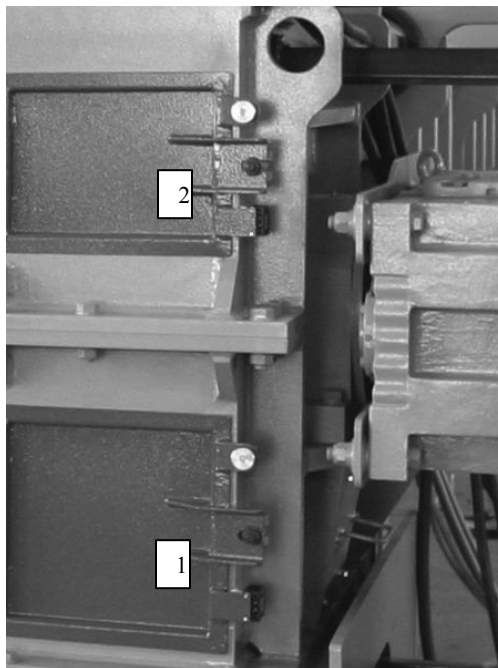
Protective Devices

The machine may under no circumstances be operated without these protective devices or with faulty or manipulated protective devices.

Safety device for housing flap

Illustration:

- (1) Safety device for lower housing flap
- (2) Safety device for upper housing flap



The shredder can only be operated if the housing flap is closed and thus deactivating the safety switch. If the housing flap is opened, the contact is

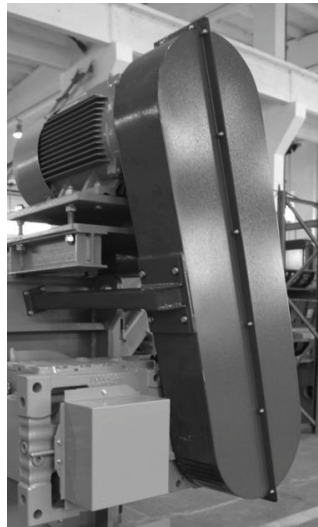
broken. If the housing flap will be opened during operation, the safety switch is activated, thus switching off the machine.

"V"-belts and pusher protector

"V"-belt and pusher protection are fixedly connected to the machine. They can be dismantled for installation and maintenance work. However, this may only then be carried out when all rotating parts have come to a complete standstill.

Illustration:

V-belt cover



Pusher cover



If machines are delivered on the request of the customer without drive motors, the operator is obliged to fit and mount the protective devices delivered together with the machine himself in line with the current legal safety regulations.

Safety Light grid

The feeding trough in feed is safeguarded by a light grid. During opening and closing of the cover it is activated. If somebody walks inside this light grid, the hydraulic will be stopped. After the cover is opened or closed the light grid is deactivated.

Illustration:
Safety Light Grid



Safety markings

Safety markings are attached to the machine. If one of these markings becomes detached or is no longer recognizable, it must be replaced. You can order new markings at specialist shops or from us.



Personal Protective Gear

The following protective gear must be worn when carrying out the outlined tasks. Use breathing equipment before inhaling substances that may be harmful to your health if necessary.

Task	Safety Helmet	Safety Boots	Safety Gloves	Safety Goggles	Ear Muffs
Unloading machine	X	X	X		
Connecting machine		X			
Operation.		X	X	X	X
Cleaning.		X	X	X	
Maintenance of bearings		X			
Maintenance of gearbox motor		X			
Maintenance of cutters/bed knives		X	X		
Knife sharpening		X	X	X	X

Chapter 3: Installation

3-1 Uncrating the Equipment

Choosing Application Site

The location of the machine and site of application must exhibit the characteristics listed below.

- Enclosed space.
- Sufficient load-bearing capacity. (Find the machine weight in Chapter 7: Technical Specifications.)
- Machine must be freely accessible from all sides.
- Sufficient available room for operating and service personnel.
- Spatial requirements—refer to the assembly drawing. All hinged parts must be able to be completely opened.
- Vibration-free surroundings.
- Sufficient lighting.
- Machine may not be exposed to direct radiation of any kind.
- Room temperature must range from 40°F (5°C) to 104°F (40°C).
- Relative atmospheric humidity according to DIN 40040: 15 to 70% (indoor). (In humidity levels of higher than 70%, apply an anti-corrosive agent to the metallic-finished machine parts. Insulation for the tropics is also necessary.)
- The machine may not be operated within range of static discharges or strong magnetic fields—this could lead to faults in the machine's control system.

Unloading and Installing the Machine

The machine and/or components are packed so they will arrive safely. Use a suitable crane or forklift for unloading the packaged machine and/or components.

- After unloading the equipment, remove the packaging material and all transportation safety devices.
- In the case that the shredder and its accessory components have been delivered as individual items, mount these at the site of application in accordance with the assembly drawing.
- Align the machine horizontally using a suitable spirit level.
- Do not use blocks to place underneath the machine; use metal strips in order to prevent buckling of the base frame. Make sure that an even distribution of weight is achieved on all the points of support.

WARNING



Suspended load! Falling loads can cause serious injury or death! Only use a crane or forklift appropriate for the weight and dimensions of the load. Use suitable means to stop and pay attention to the center of gravity. Do NOT step under the suspended load. Wear a safety helmet in addition to the basic protective gear.

Overturning or falling machine! Serious injury or death can result! In case that the granulation will be placed erect over a pit, on a frame, or on a platform, the machine MUST be secured by placing mounting screws through the holes on the mounting pads (see assembly drawing).

3-1 Electrical Connections

CAUTION



Electrical connections should only be made by qualified electricians!

Voltage, current, frequency, and protection are marked on the type plate. The voltage tolerance is +/- 10%.

For machines that are not pre-wired, the electrical connection is to be carried out in accordance with the enclosed wiring diagram in the terminal box. When performing this task, it is important to follow the regulations of the local electricity authority. The required cable cross-section is determined according to the rated capacity of the units. The wiring schematics are located in the control panel.

NOTE: **Alterations to the wiring diagrams require the approval of the manufacturer. Failure to obtain approval will result in the termination of all guaranteed claims.**

WARNING



Dangerous voltage. Touching live parts can lead to serious injury or death! All work relating to the electricity of the machine may only be carried out by trained electricians. Observe the currently effective EMC regulations.

Caution must be taken to prevent electrical shock when operating certain equipment. Installation, service, alterations, and/or modifications must only be done by qualified personnel and with a high regard for safety. Failing to conform to the requirements could result in bodily injury, costly damage, or death!

Connection of Emergency Stop Button

The machine must only be operated with installed Emergency Stop buttons. If the Emergency Stop buttons are not installed prior to delivery, one Emergency Stop button must be installed at the control cabinet and a second one at the grinding material in-feed.

NOTE: The control panel with the switches and Emergency Stop button should be installed near the machine; the distance should not exceed 16 ft (5 m). The connecting cables between the control panel and machine must be protected against damage. If the control panel cannot be installed according to these rules, an additional Emergency Stop button must be installed on the machine

3-2 Initial Start-up

General Advice

All work related to the start-up of the machine must be carried out by trained and specialized personnel.



Check the oil level of the gearbox before operating the machine!

Fill hydraulic tank with oil. Please observe the instructions in the operational manual!

Checking the Rotational Direction

Rotational direction of the motors must be checked before initial start-up. The following steps must be completed.

- Switch the machine on and immediately off again.
- Observe whether the discharge air fan in the drive motor is rotating in the direction of the directional arrow.

NOTE: If running in the wrong direction, re-connect the motor connection immediately. Damage to the machine will result from operating in the wrong direction.

Start-up Checklist

- ☑ When the housing panel is opened, check the cutter mounting screws using a torque wrench.
- ☑ Search the grinding chamber for foreign matter.
- ☑ Check oil level of the gearbox motor.
- ☑ Examine in-feed device for foreign matter.
- ☑ Check that the Emergency Stop buttons are unlocked.
- ☑ Check all safety devices for proper function.
- ☑ Switch ON the machine for a short time to check the rotational direction—can be seen at the discharge air fan of the drive motor—observe the running direction arrow.
- ☑ Allow machine to run approximately 10 minutes without grinding material.
- ☑ Connect material discharge and in-feed device; check rotational direction drives.
- ☑ Feed grinding material uniformly; too much material can cause the machine to overload.
- ☑ Check the temperature of ground material if necessary.
- ☑ Monitor the ammeter. This displays the present current consumption and provides information on the load of the machine.

Chapter 4: Operation

4-1 Start-up

Machine Checks Prior to Start-up

- ☑ The cutters are properly set and the screws are tightened with the specified torque.
- ☑ The grinding chamber is free of foreign matter.
- ☑ The housing panel is closed.
- ☑ All safety devices, including devices for the grinding material in-feed and discharge devices, are checked for proper function.

Switching Machine ON

1. Switch on the grinding material discharge device.
2. Switch on the hydraulics
3. Switch on the machine (main switch to 1)
4. Set to automatic on the control board
5. After cover is opened put in the pipe
6. Press cycle start button
7. Machine will operate automatically

4-2 Operation Procedures

Manual In-feed of Material

- Throw the grinding material into the feeding trough than start the cycle.
- The material should be fed into the front of the machine.
- During opening and closing of the cover, the safety light grid is activated. The hydraulic will stop when somebody reaches in this light grid.



Rotating knives can cause serious injuries and death! Do NOT reach into the in-feed hopper or lean in while the rotor is operating. Use only approved grinding material!

DO NOT climb into the in-feed hopper while operating the machine. Death will result!

4-3 Shut-down

Switching Machine OFF

1. Wait until the cycle is finished and the cover has opened.
2. Then switch off the shredder, (main switch to 0).
3. If you want to close the cover of the feeding trough, close it manually by pressing the button cover close.
4. Switch off the grinding material discharge device.

Chapter 5: Maintenance

5-1 Preventative Maintenance Schedule

Only trained personnel may perform maintenance on the machine. The maintenance must be performed within the specified time and also documented for records. Regular maintenance is important to the continued effectiveness and efficiency of the machine.



Electrical voltage causes danger while starting the machine for maintenance—the main switch **MUST** be turned to 0, the machine must be safeguarded with a padlock, and a warning sign must be attached.

Maintenance Plan

The following maintenance must be completed after every 8 operation hours:

- Check protective devices for proper function.
- Check mountings of cutters and bed knives.
- Check the condition of the cutters and bed knives.

The following maintenance must be completed after every 40 operation hours:

- Check that all screws are tightened.
- Check all wearing parts.
- Check hydraulic oil level and consistence.

The following maintenance must be completed after every 2000 operation hours:

- Check the oil level in the gearbox motor.

The following maintenance must be completed when necessary:

- Clean the machine.
- Check the main bearings (bearing clearance, lubricant renewal).

Yearly Maintenance:

- The purpose of yearly maintenance is to check the general condition of the machine and to arrange for the arrival of any necessary replacement parts in good time. A service engineer can assist in performing this task.

5-2 Preventative & Corrective Maintenance

Checking the Protective Devices

Check all safety devices for stipulated condition, location, and function; verify they have safe mountings.



Danger results from non-functioning protective devices! Serious injury or death can result. Eliminate all defects before you put the machine into operation! If defects occur during operation, stop the machine immediately and eliminate the defect! Do NOT change or remove any protective devices. Do NOT modify the protective devices

Cleaning the Machine

To clean the machine, follow the steps below.

1. Switch OFF the shredder at main switch.
2. Safeguard main switch with a padlock.
3. Open the housing panel.
4. Safeguard the housing panel.
5. Pre-clean the grinding chamber with a hand brush.
6. Evacuate the remaining grinding material residue with a suitable suction device.
7. Remove any clinging residue with a wooden scraper.
8. Close the housing panel.
9. Machine can be started again.



Danger of cutting caused by sharp knives even while the rotor is stationary. Serious injury may result—especially to the hands and fingers—wear protective gloves.

Inhalation of dust can be hazardous and can result in respiratory injury—never blow out the residue and use breathing protection if necessary.

Replacing the Gearbox Motor

The gearbox motor's dimensions make replacing the gearbox necessary only in exceptional cases. Dismounting and mounting the gearbox requires specialized knowledge. Please observe the installation requirements of the gearbox manufacturer.

Replacing the Rotor

The rotor has a heavy-duty design, which makes replacement necessary only after a crash, i.e. a hammer falls inside the machine. Dismounting and mounting the rotor requires specialized knowledge.

Dismounting the rotor

Follow the steps below to dismount the rotor.

1. Dismount the gearbox motor.
2. Remove the rotor mounting slot cover plates from the housing.
3. Screw in hooks on both shaft ends.
4. Remove the bearing housing mounting bolt.
5. Carefully lift the rotor out of the housing using suitable lifting equipment.
6. Place the rotor in a safe location (appropriately-sized timber beams are suitable for this).

Mounting the rotor

Clean the bearing seat surfaces and check the key before proceeding as follows to mount the rotor.

1. Lift the rotor using suitable lifting/stopping equipment and place the rotor carefully into the bearing seats.
2. Attach the bearing housing (Pos) to the bearing seats with screws.
3. Place the gearbox motor onto the rotor axis.
4. Return the rotor mounting slot cover plates.
5. Carry out a test run.

Replacing the Main Bearings

The dimensions of the main bearings make a replacement necessary only in exceptional cases. Dismounting and mounting the bearings requires specialized knowledge; therefore, please observe all instructions provided by the manufacturer or call customer service for assistance.

The bearings mounting in this machine are indicated in the spare parts list. A requirement for dismounting and mounting the bearings is a suitable pulling-off device.

Dismounting the main bearings

Follow the steps below to dismount the main bearings.

1. Dismount the gearbox motor.
2. Pull the distance sleeve from the rotor axis.
3. Remove the rotor cover plates from the housing.
4. Screw in hooks/eye bolts on both shaft ends.
5. Hang the rotor from hooks/eye bolts on both shaft ends.
6. Remove the bearing housing mounting bolt.
7. Carefully lift out the complete rotor using suitable lifting equipment.
8. Place the rotor in a safe location (timber beams are recommended).
9. Loosen the bearings cover mounting screws and take off the bearing cover.
10. Pull the bearing housing off using a pulling-off device.
11. Pull the bearing off the rotor axis using a pulling-off device.

Mounting the main bearings

Thoroughly clean the bearing surfaces and the shaft surfaces and grease them lightly before following the steps below to mount the main bearings.

1. Mount the bearing in bearing housing.
2. Attach the bearing with the bearing housing to the rotor axis.
3. Lift the rotor using suitable equipment; carefully place the rotor into the bearing seats.
4. Attach the bearing housing to the bearing seats with screws.
5. Return the distance sleeve to the rotor axis.
6. Return the gearbox motor to the rotor axis.
7. Return the rotor cover plates.
8. Carry out a test run.

NOTE: The mounting forces must always engage the inner-ring or roller body damage will result. The hardened bearing rings are sensitive to stressed impact; never hit the rings directly with a hammer. It is recommended to use a brass arbor or piping piece made from soft material. The bearing should be put onto the shaft using light blows. When performing this task, the force of pressure must be evenly distributed on the circumference of the bearing ring.

Lubricating the Main Bearings

A correct lubricant supply is an important requirement for operational safety and long service life of bearings. Every machine is greased and test runs are performed before delivery.

NOTE: Unsuitable lubricant, lubricant deficiency, excessive lubricant, or impurities in the lubricant lead to overheating and extreme wear of the bearings.

Lubrication intervals

Use the following table to determine when to check and replace the lubricant.

Shift Operation	When to Replace	When to Check
One shift operation.	Every 18 months.	Monthly.
Two shift operation.	Every 9 months.	Monthly.
Three shift operation.	Every 6 months.	Monthly.

Checking lubricant quality

When determining whether a lubricant needs to be replaced, check for the following:

- Change in consistency.
- Discoloration.
- Degree of soiling.

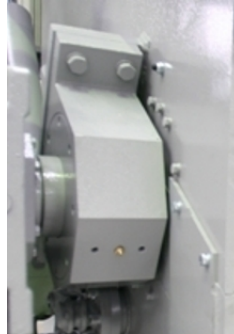
Replacing or refilling lubricant

- **Fill the bearings uniformly with grease until all operating surfaces are well-greased.**
- **A lubricant quantity of 1/3 to 1/2 of the bearing volume per bearing is required. If too much grease is used, the lubricant will become unusable due to excessive temperature.**
- **Only one type of grease must be used. Mixing different types of grease together is prohibited. The bearings are filled at the factory with lithium base saponification roller bearing grease F3.**
- **Use the “List of lubricants” to determine which lubricants from which manufacturers to use.**

Refilling lubricant

The grease travels through the circulating grooves and bores via lubrication nipples into the interior of the bearing. The greasing quantity is 2 oz. (60g) to 3.5 oz. (100g) roller bearing grease F3 per bearing.

Grease
nipple



Replacing lubricant

Renewing the lubricant between the specified intervals is only necessary when unusual bearing noises or overheating occurs. Mounting and dismounting the bearings must be performed according to the instruction in the operation manual.

Follow the steps below to replace the lubricant.

1. Open the bearing.
2. Remove the bearing housing and the bearing cover.
3. Carefully clean the bearing with petroleum ether. (Petroleum ether, petroleum, spirit, aqueous neutral, or alkaline cleaning agents may be used to clean the bearings.) The bearing must be immediately preserved with the lubricant after cleaning in order to avoid corrosion.
4. Fill the bearing with an approved lubricant (see “list of lubricants”).

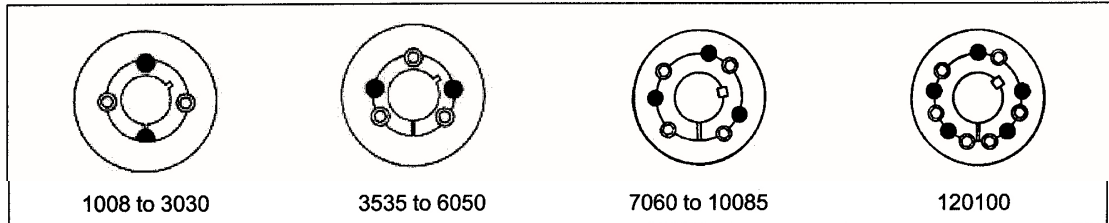
List of lubricants

Name/ Country of Manufacturer	Roller Bearing Grease
ARAL	ARAL Grease HL 3
BP	BP ENERGREASE LS 3
CASTROL	CASTROL SPHEEROL AP 3
ESSO	Beacon 3
FUCHS	FUCHS Grease 1200; FUCHS Grease FWA 220
SHELL	SHELL Alvania Grease 3
MOBIL-OIL	MOBILUX 3
WISURA	WISURA Liba L 3
Zeller & Gmelin	ZET GE Grease M 50
FAG	FAG L 71
ANTAR Petroles de l'Antantique	ROLEXA
Holland, Beverol	Beverol Multi-Purpose Grease
Italy, Agip	AGIP Grease 33 FD
Sweden, NYNAS	Nynas FI 3-42


Mounting and dismounting TAPER-LOCK tensioning element

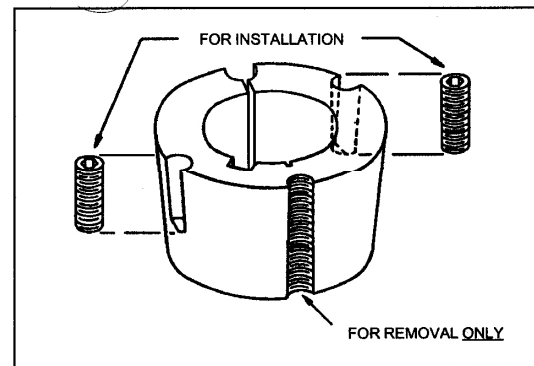
The motor- and the gear-"V"-belt pulleys are attached onto the shaft by means of a TAPER-LOCK tensioning element. The disks must be dismantled for certain maintenance work.

IMPORTANT: Follow all instructions in this manual carefully. This is necessary to insure satisfactory performance.



To Install:

1. Clean shaft, bore, and outside of bushing, and bore of hub (taking bushing from hub if already assembled). Remove any oil, lacquer, or dirt. Place bushing in hub and match half holes to make complete holes (each complete hole will be threaded on one side only).
2. Oil thread and point of set screws or thread and under head of cap screws. Place screws loosely in holes that are threaded on hub side (shown thus  in diagram).
3. Make sure bushing is free in hub. Slip assembly onto shaft and locate in position desired.
4. Tighten screws (see note*) alternately and evenly until all are pulled up very tightly. Use a piece of pipe on wrench to increase leverage. (See table for wrench torque on reverse side.)
5. Hammer against large end of bushing using hammer and block or sleeve to avoid damage. Screws can now be turned a little more using the specified wrench torque. Repeat this alternate hammering and screw re-tightening until the specified wrench torque no longer turns the screws after hammering.
6. After drive has been running under load for a short time stop and check tightness of screws. Fill other holes with grease to exclude dirt.



To Remove:


1. Remove all screws. Oil thread and point of set screws or thread and under head of cap screws.
2. Insert screws in holds that are threaded on bushing side (shown thus  in diagram). In sizes where washers are found under screw heads, be sure to use these washers. Note that one screw in each hub is left over and is not used in this loosening operation.
3. Tighten screws alternately until bushing is loosened in hub. If bushing does not loosen immediately, tap on hub.

Table for the tightening torque of the screws

Tensioning element (Type)	Screws-Tightening torque in Nm	Screw details Number	Size (BSW)
3535	60	3	1/2"

Mounting the TAPER-LOCK tensioning element

Proceed as follows:

- Remove the protective coating from the bore and outside of bushing, and bore of hub. After ensuring that the mating tapered surfaces are completely clean and free from oil or dirt. Insert bushing in hub so that holes line up.
- Sparingly oil thread and point of grub screws, or thread and under head on cap screws. Place screws loosely in holes threaded in hub, shown thus ☉ in.
- Clean shaft and fit hub to shaft as one unit and locate in position desired, remembering that bushing will hip the shaft first and then will be slightly drawn on the bush.
- Using a hexagon wrench tighten screws gradually and alternately to certain torque.
- Hammer against large-end of bushing, using a block or sleeve to prevent damage. (This will ensure that the bushing is seated squarely in the bore). Screws will now turn a little more. Repeat this alternate hammering and screw tightening once or twice to achieve maximum grip on the shaft.
- If a key is to be fitted, place it in the shaft keyway before fitting the bushing. It is essential that it is a parallel key and side fitting only and has TOP CLEARANCE.
- After drive has been running under load for a short time stop and check tightness of screws.
- Fill empty holes with grease to exclude dirt.

Dismounting the TAPER-LOCK tensioning element

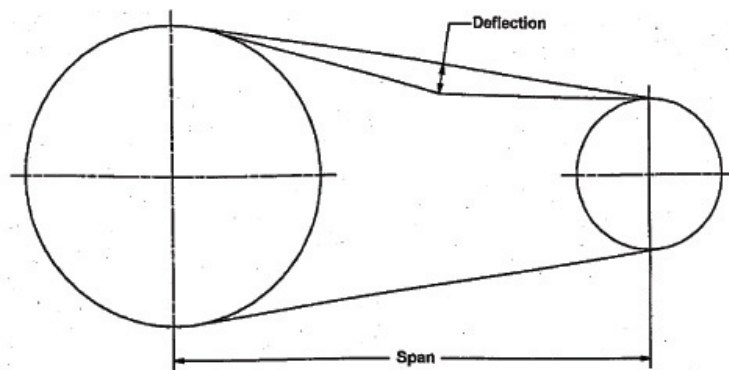
Proceed as follows:

- Slacken all screws by several turns, remove one or two according to number of jacking off holes shown thus • in the illustration. Insert screws in jacking off holes after oiling thread and point of grub screws or thread and under head of cap screws.
- Tighten screws alternately until bushing is loosened in hub and assembly is free on the shaft.
- Remove assembly from shaft.

Work on the “V” belts

"V"-belts are wearing parts, which stretch and must be re-tensioned. In order to guarantee a long service life of the "V"- belts, regular checks on the tension force of the "V"-belts and the condition of the "V"-belts are necessary.

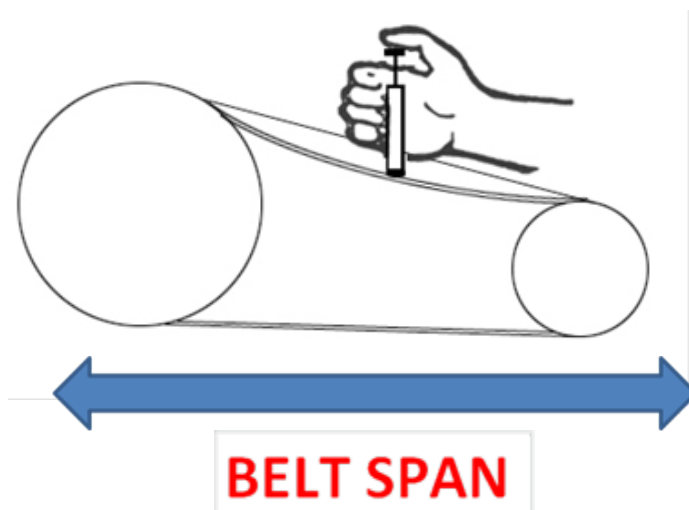
Checking the tension force of the “V” belt



1. Verify that the alignment of the pulley is correct. Utilizing a straightedge of sufficient length to span from one pulley to the other, place it along the sides of both pulleys. The entire face of each pulley should fully contact the straightedge.
2. Measure the belt **SPAN** with a measuring tape. Record this dimension in your note book.
3. Using the deflection tester, apply a perpendicular force at the midpoint of any one of the belts to deflect the belt 1/64th of an inch.
4. Calculate the deflection force:

$$\text{FORCE}[\text{Lb}] = \text{SPAN}[\text{IN}] \times (1/64)[\text{Lb}/\text{IN}]$$

5. Identify the belt type and measure the small sheave diameter. Look up the proper model belt deflection force table and find out what the force is supposed to be.
6. The motor position should be adjusted until the actual deflection force matches the force listed in the table.



7. In no case should the belts be over tensioned, as this can significantly reduce belt and/or bearing life

BELT CROSS SECTION	SMALL SHEAVE DIAMETER RANGE	DEFLECTION FORCE (Lbs)
SPA	3.9-5.2	5.9
SPA	5.5-7.9	7.7
SPB	6.2-8.9	11
SPB	9.2-12.4	14.3
SPC	8.8-14.0	19.8
SPC	14.7-22.0	26.4
XPB	8.8-9.84	7.7

Checking “V” belt condition, replacing “V” belt



Serious injury can result by running “V” belt. Never dismount the “V” belt cover and window during operation. Hair, jewelry etc. can be pulled into the machine.

Working on the Cutters

The correct grinding properties, the correct setting, and the correct mounting of the cutters are all important factors to ensure proper function and economic operation of the shredder.

Replacing and checking the cutter mountings

- Certain machine parts are subject to stress while operating due to vibrations, which can lead to the loosening of screw connections. It is very important to check the cutter mounting screws according to the intervals in the maintenance plan.
- Tighten the mounting screws on the cutters using a torque wrench set to the required torque for the screw size. The required torque for the cutter mounting bolts is 120 Nm.
- Use the table below to determine torque values. The tightening capacity decreases on screws that have been loosened and tightened several times. New screws of the same material must replace the cutter mounting screws after they have been loosened and tightened several times.

Torque Value Table

Bolt Type	Grade 8.8		Grade 10.9		Grade 12.9	
	Nm	lb. ft.	Nm	lb. ft.	Nm	lb. ft.
M8	25	18.4	35	25.8	41	30.2
M10	49	36	69	60	83	61.2
M12	86	63.4	120	88.5	145	106
M16	210	154	295	271	355	261
M20	410	302	580	428	690	508
M24	710	523	1000	737	1200	885

Checking the condition of the cutters

The cutters become blunt after a certain number of operation hours. They need to be checked regularly. *Using blunt knives has several consequences including decreased grinding capacity, increased current consumption of the drive motor, inexact cuts, and overheating of the material.*



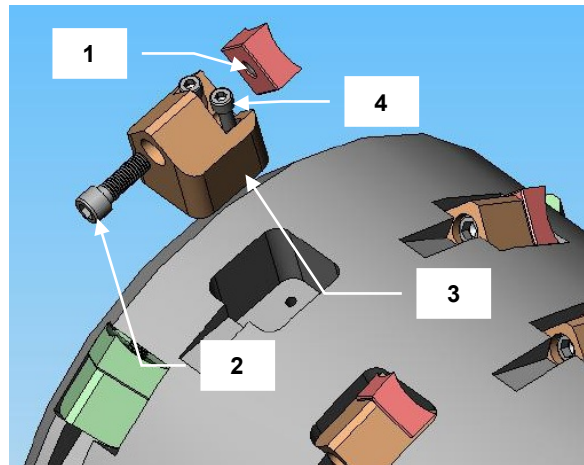
Sharp knives are dangerous even while the rotor is at standstill. Serious injury can result—especially to the hands and fingers—wear protective gloves!

Dismounting the cutters

Follow the steps below to dismount the cutters. (See image below.)

1. Switch OFF the shredder at the main switch.
2. Safeguard the main switch with a padlock.
3. Open the lower housing panel.
4. Safeguard the housing panel.
5. Clean the hexagon head socket of the cutter mounting bolt (2).
6. Loosen the bolt using a high quality Allen key (.4 in./10 mm). Lightly knock the Allen key with a hammer to loosen if necessary.
7. Take out the cutter mounting bolt, the washer, and the cutter.

- (1) Cutter
- (2) Cutter mounting screw
- (3) Cutter holder
- (4) Cutter mounting screws



NOTE: It is possible to reach the cutting shaft by climbing into the feeding chamber; however, it is strongly recommended that the cutters are accessed through the front size door. The shaft can be rotated manually by turning the motor V-belt pulley.

! WARNING



Sharp knives are dangerous even while the rotor is at standstill. Serious injury can result—especially to the hands and fingers—wear protective gloves!

Dismounting the cutter holders

Follow the steps below to dismount the cutter holders. (See previous image.)

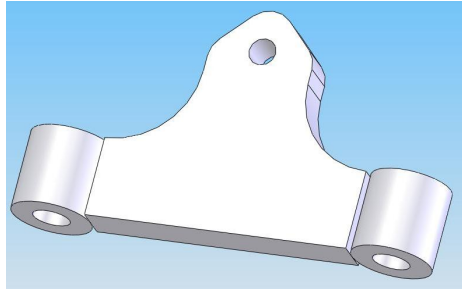
1. Switch OFF the shredder at main switch.
2. Safeguard the main switch with a padlock.
3. Open the lower housing panel.
4. Safeguard the housing panel.
5. Clean the hexagon head socket of the cutter mounting (2).
6. Loosen the bolt using a high quality Allen key (.4 in./10 mm). Light knock the Allen key with a hammer to loosen if necessary.
7. Take out the cutter holder mounting bolts.
8. Remove the cutter holder with the delivered Extractor.

NOTE: It is possible to reach the cutting shaft by climbing into the feeding chamber; however, it is strongly recommended that the cutters are accessed through the front size door. The shaft can be rotated manually by turning the motor V-belt pulley.

WARNING



Sharp knives are dangerous even while the rotor is at standstill. Serious injury can result—especially to the hands and fingers—wear protective gloves!

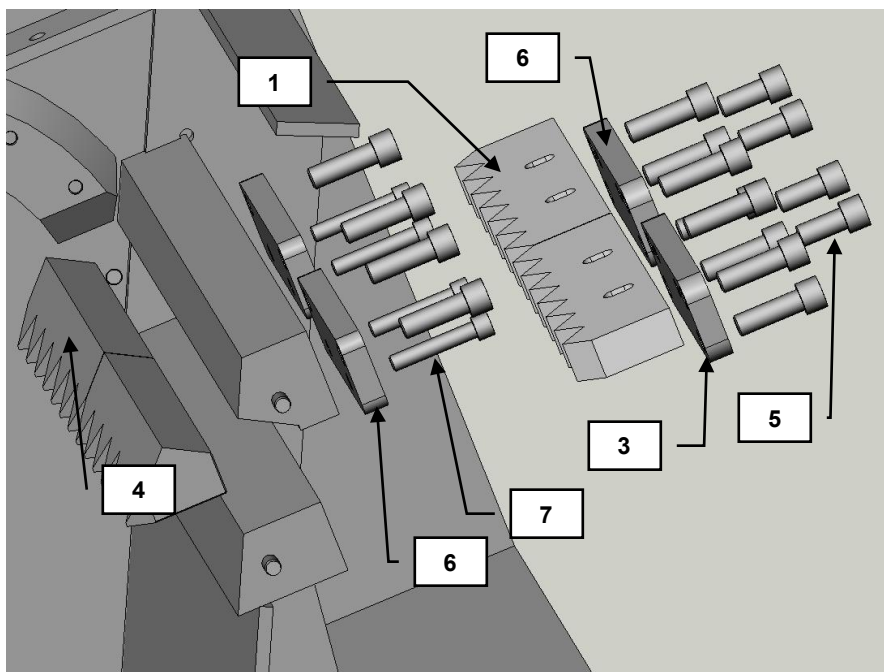


Dismounting the bed knives

Follow the steps below to dismount the bed knives. (See image below.)

1. Switch OFF the shredder at the main switch.
2. Safeguard main switch with padlock.
3. Open the upper housing panel.
4. Safeguard the housing panel.
5. Clean the hexagon head socket of the knife mounting bolts (2) and the cover plates mounting bolts.
6. Loosen the cover plate mounting bolts with Allen key; lightly knock with a hammer if necessary.
7. Take out the bolts and cover plates.
8. Loosen the knife adjusting screws for pulling and take them out. Loosen the knife mounting bolts using an Allen key; knock lightly with a hammer if necessary.
9. Take out the knife mounting bolt and the knife.

- (1) Bed knife
- (2) Bed knife mounting screws
- (3) Bed knife holder
- (4) Cover plates
- (5) Bed knife adjusting screw
- (6) Cover plate holder
- (7) Cover plate mounting screws



Mounting the cutter holders

Follow the steps below to mount the cutter holders.

1. Clean the knife pocket and the cutter holder.
2. Insert the cutter holder into the pocket.

NOTE: Cutter holder must slide in easily. Do NOT damage the cutter holder surfaces with a hammer.

3. Attach the cutter holder mounting bolts (DIN912 – M8x25 – 12.9) and add some Loctite.
4. Make sure that the cutter holder fits properly.
5. Tight the cutter mounting bolts using a torque wrench. **The required torque for the cutter holder mounting bolts is 39 Nm.** (Refer to torque values table.)

Mounting the cutters

NOTE: The cutters and bed knives—especially the cutters—should only be sharpened or replaced in sets. There is a danger of balance error if a combination of cutters from different sets is used.

Follow the steps below to mount the cutters.

1. Clean the knife support surface and the hole on the cutter holder.
2. Insert sharp cutter or turn old cutter and push against the cutter holder surface.
3. Attach the cutter mounting bolt (DIN912 – M12x40 – 12.9), and the washer (DIN433 – 13 – 300HV).
4. Screw in the mounting screws and tighten lightly first. **Make sure the cutter fits planar in the seat!**
5. Tighten the cutter mounting bolts using a torque wrench. The required torque for all cutter mounting bolts is 120 Nm (refer to the torque values table).
6. Make sure the cutting gap is correct and also that the cutters and bed knives do not collide as the rotor turns.
7. Remove tools and other objects from the cutter chamber.
8. Switch ON the shredder for a brief time without grinding material; listen for noises. If unusual noises are present, determine the cause and eliminate it.

NOTE: Cutters are reversible and have four symmetrical cutting edges, which makes it possible to turn the cutters and only to sharpen after every fourth cutter change.



Sharp knives are dangerous even while the rotor is at standstill. Serious injury can result—especially to the hands and fingers—wear protective gloves!

Mounting the bed knives

Follow the steps below to mount the bed knives.

1. Clean the knife supporting surface and the holes on the knife holder.
2. Insert sharp knife or turn old knife.
3. Attach the knife adjusting bolts.
4. Attach the knife mounting bolts (DIN912 – M12x55 – 12.9) and tighten lightly at first.
5. Adjust the gap between the cutters and bed knives to 0.03 in. to 0.04 in. (.8 – 1mm).
6. Tighten the knife mounting bolts using a torque wrench. The required torque for all knife mounting bolts is 120 Nm (refer to the torque values table).
7. Turn the rotor by hand.
8. Make sure the cutting gap is correct and that the cutters and bed knives do not collide as the rotor turns.
9. Return the cover plates and mount them with the bolts.
10. Remove tools and other objects from the cutting chamber.
11. Switch ON the shredder for a brief time without grinding material; listen for noises. If unusual noises are present, determine the cause and eliminate it.

Sharpening cutters and bed knives

Shredder cutters have four cutting edges, which means they can be turned three times. After the third turn, they should be replaced with new ones. Bed knives can be turned two times and can be re-sharpened for as long as they can be mounted with the long hole.

NOTE: Specialist sharpening of the cutters and bed knives is available through customer service.

NOTE: The cutters and bed knives—especially the cutters—should only be sharpened or replaced in sets. There is danger of balance error if a combination of cutters from different sets is used.

Follow the steps below to sharpen the cutters and bed knives.

1. Dismount the cutters.
2. Sharpen the cutters. *A specialist should use the sharpening plan to uniformly sharpen the cutting knives mechanically. It is important to make sure that sharpening takes places with small grinding allowance and sufficient coolant supply. The sharpening process is finished when the cutting edge is sharply cut. Not all indentations must be worked out, or the number of possibilities for sharpening is reduced. For the sharpening process, use soft grinding wheels (40H or 46K). Knives with grinding cracks should not be re-used due to danger or breakage during operation.*
3. Whet the cutting edges of the cutters and bed knives with a whetstone.
4. Set the cutters and bed knives.
5. Mount the cutters and bed knives.



Sharp knives are dangerous even while the rotor is at standstill. Serious injury can result—especially to the hands and fingers—wear protective gloves!

Setting the cutters and bed knives

Rotor knives used in this machine don't have to be adjusted. All adjustments have to be done with the bed knives. To simplify knife setting and shorten the standstill, the bed knives have four adjusting screws—two for pulling and two for pushing the knife. Standstill needs to be avoided/reduced if there are multiple cutter sets. Setting the gap between the cutters and bed knives carefully and correctly is an important requirement for the productivity of the shredder. Factors for the size of the gap include the size and design of the rotor and the material to be ground.

Follow the steps below to set the cutters and bed knives.

1. Remove old knives.
2. Insert sharp knife or turn old knife.
3. Attach the knife adjusting bolts and adjust them roughly. Attach the knife mounting bolts (DIN912 – M12x55 – 12.9) and tighten lightly first.
4. Adjust the gap between the cutter and bed knife to 0.3 in. to 0.4 in. (0.8 to 1 mm).
5. Tighten the knife mounting bolts using a torque wrench. The required torque for all knife mounting bolts is 120 Nm (refer to torque values table).
6. Turn the rotor by hand.
7. Make sure the cutting gap is correct and also that the cutters and bed knives do not collide as the rotor turns.
8. Mount the knife cover plates.

Transporting and storing the cutters and bed knives



Sharp knives present danger of cutting! Serious injury can result—especially to the hands and fingers—wear protective gloves!

- ***Only transport and store the packaged cutters and bed knives.***
- ***Grease the cutters and bed knives to avoid rust.***
- ***Protect the cutting edges with doubled cardboard, and use adhesive tape to safeguard the cutters and bed knives from slipping out of the sides.***
- ***After unpacking, the cutters and bed knives MUST be de-greased in order to promote a safe grip!***

Chapter 6: Troubleshooting

6-1 Introduction

The utmost in safety precautions should be observed at all times when working on or around the machine and the electrical components. All normal trouble-shooting must be accomplished with the power off, line fuses removed, and with the machine tagged as out of service.

The use of good quality test equipment cannot be over-emphasized when troubleshooting is indicated. Use a good ammeter that can measure at least twice the AC and DC current that can be encountered for the machine. Be sure that the voltmeter has at least minimum impedance of 5,000 OHMS-per-volt on AC and 20,000 OHMS-per-volt on DC scales. Popular combination meters, VOM and VTVM can be selected to provide the necessary functions.

Before making haphazard substitutions and repairs when defective electrical components are malfunctioning, we recommend that you check the associated circuitry and assemblies for other defective devices. It is common to replace the obviously damaged component without actually locating the real cause of the trouble. Such hasty substitutions will only destroy the new component. Refer to wiring diagrams and schematics.

Locating mechanical problems, should they occur, is relatively straightforward. When necessary, refer to the parts catalog section.

Problem	Possible Cause	Possible Remedy
Motor doesn't work	Electric source Motor damage	Correct wire connection Replace motor
Oil pump doesn't work	Motor not working Pump damage	Correct wire connection Replace pump
Oil pump noise	Filter jam Hydraulic oil too thick Poor hydraulic oil quality Pipe leaking Pump damage Motor and pump misalignment	Clean the filter Change hydraulic oil Change hydraulic oil Tighten pipe connectors Change pump
Working pressure abnormal	Spillover valve and sequence valve jam Pump damage	Clean spill over valve and sequence valve Change pump
Pressure maintain abnormal	Sealing broken Pipe leak Single direction valve jam	Change sealing Check and solve the leak Clean the valve
Work abnormal	Pressure abnormal Magnetic valve abnormal Electrical problem	Clean spill over valve and sequence valve If the valve jams, clean it. If it is broken, change it Check and change the broken electrical parts

Chapter 7: Appendix

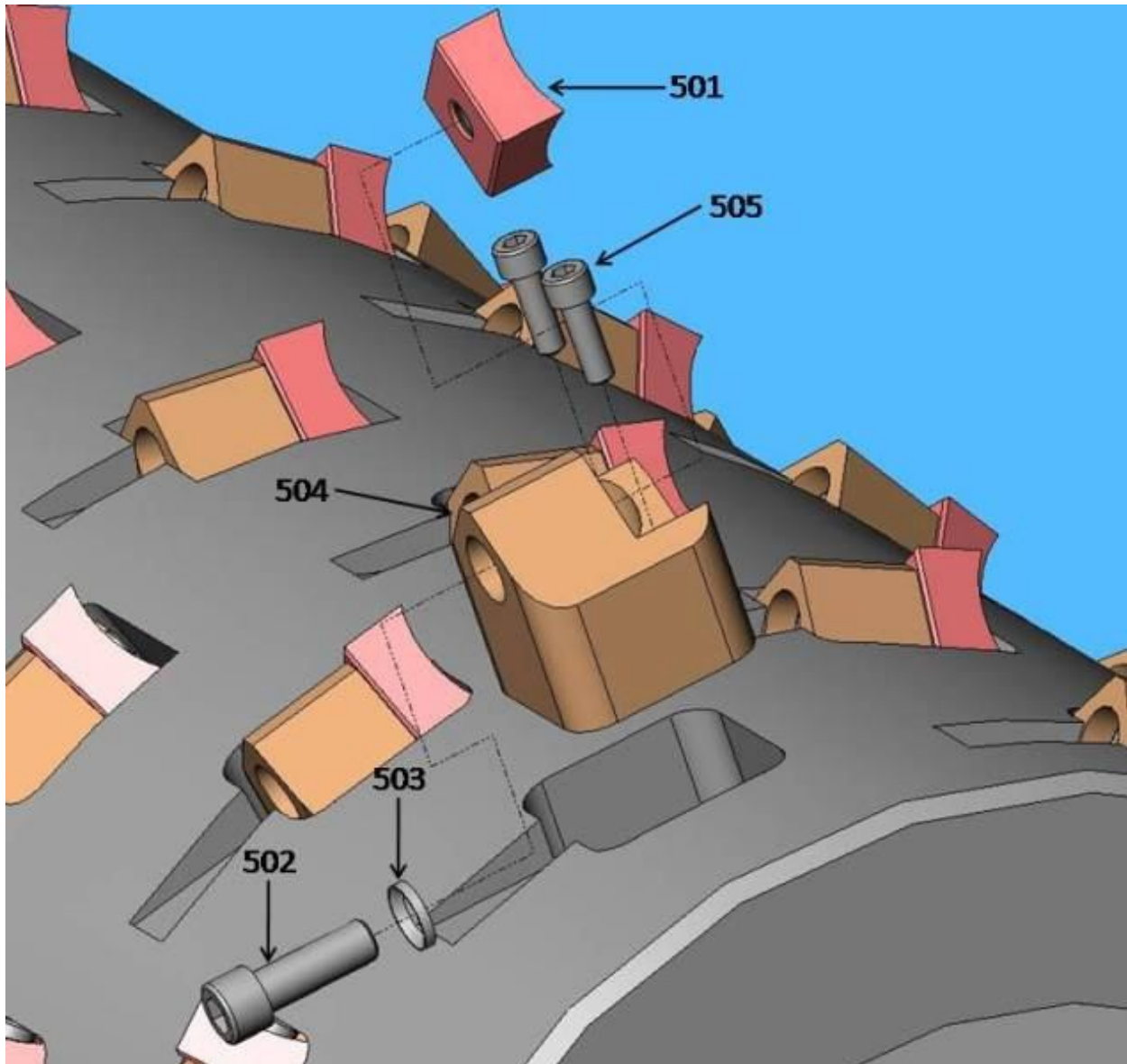
7-1 Technical Specifications

Feeding chamber opening:	Data in mm:	6720x840
Rotor dimension:	Diameter in mm:	980
	Width of cut in mm:	1210
Rotor type E		
Rotor knives:	No. of rotor knives:	108
Stator knives:	No. of stator knives:	4
	Rows of stator knives:	1x4
Rotor speed (50Hz):	rpm	36
Width:	Data in mm:	2820
Length:	Data in mm:	11770
Height:	Data in mm:	2590
Drive motor:	Power in kW:	2x45
Motor hydraulic unit	Power in kW:	15
Range of stage cylinder:	Data in mm:	7000
Machine weigh:	In kg	Approx. 20
Electrical connection data:	Markings are attached to the maching	
Noise level: Depends on plant location and type of grinding material!	Without noise equipment, in dB(A):	Approx. 95
	With noise equipment in dB(A):	Depends on type of soundproof

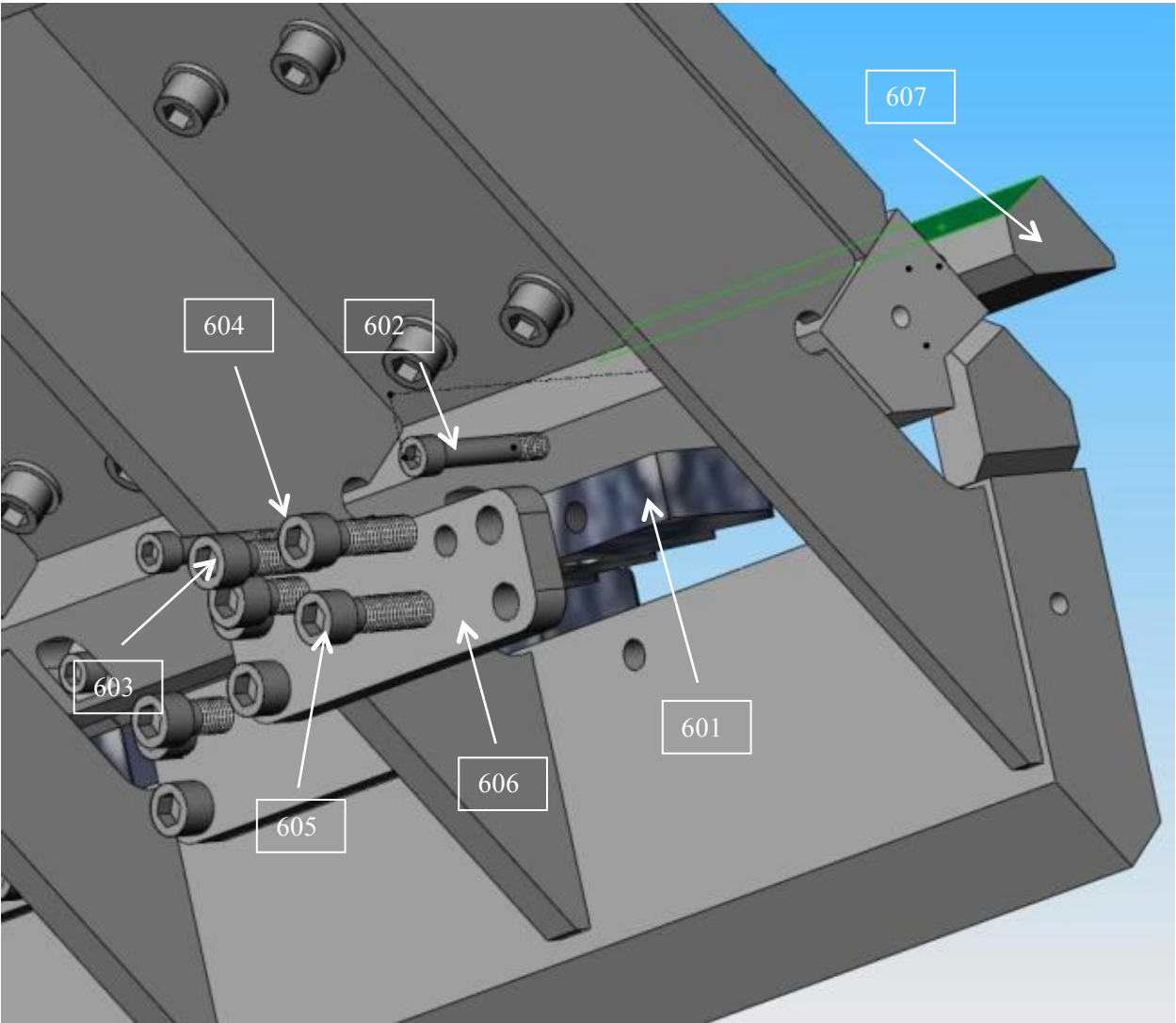
7-3 Drawings and Diagrams

(See corresponding spare parts lists)

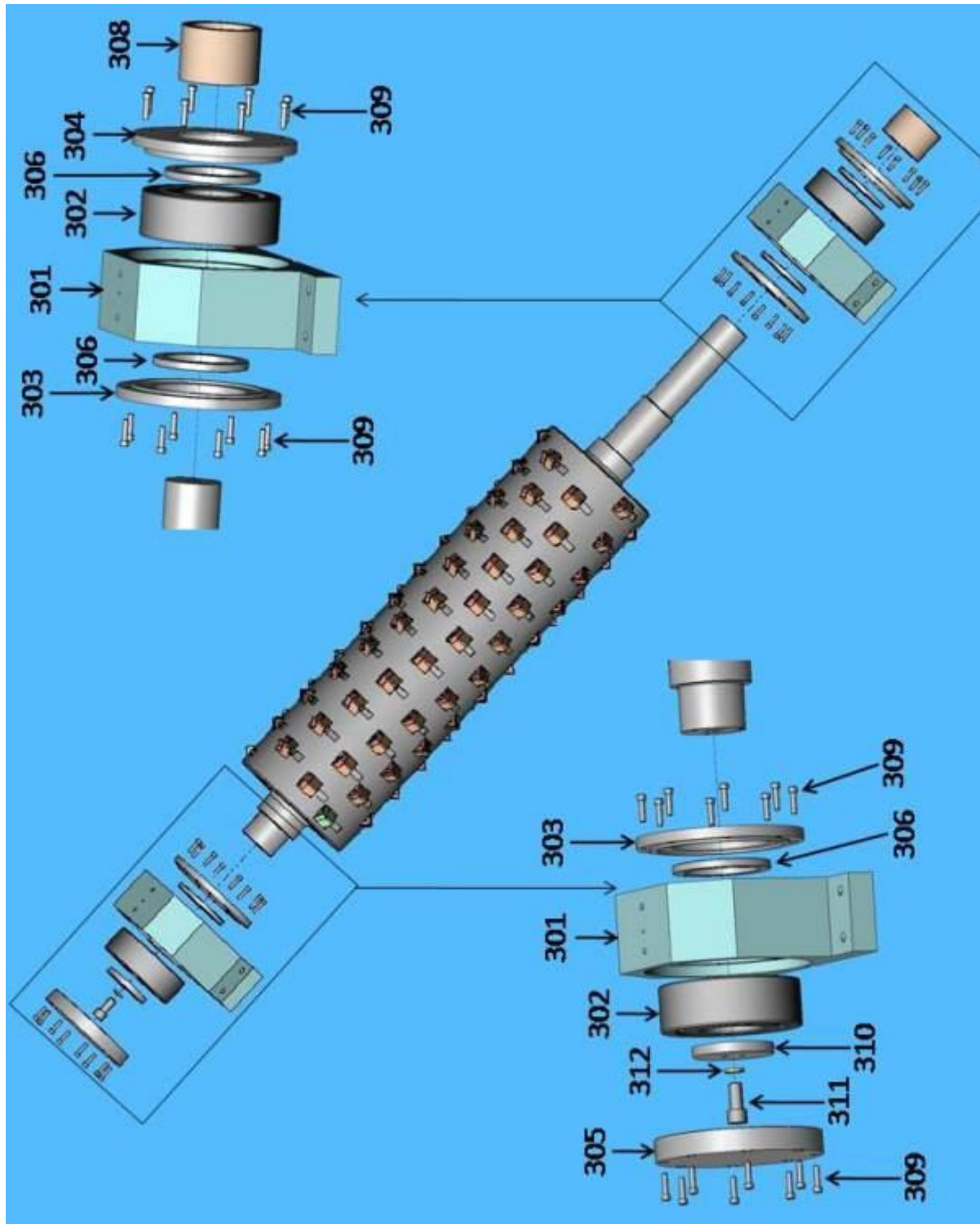
Rotor knife fixing



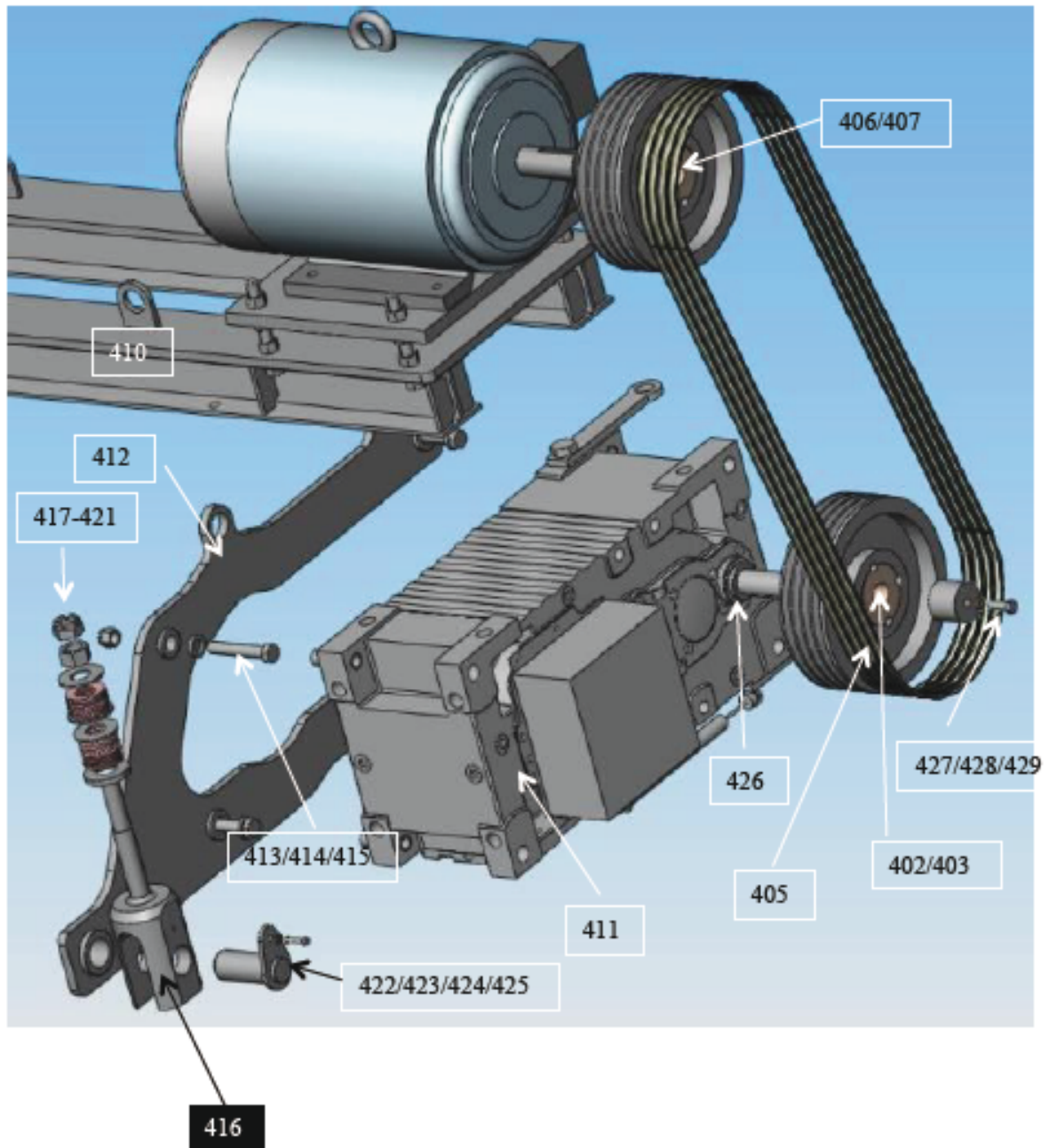
Stator knife fixing



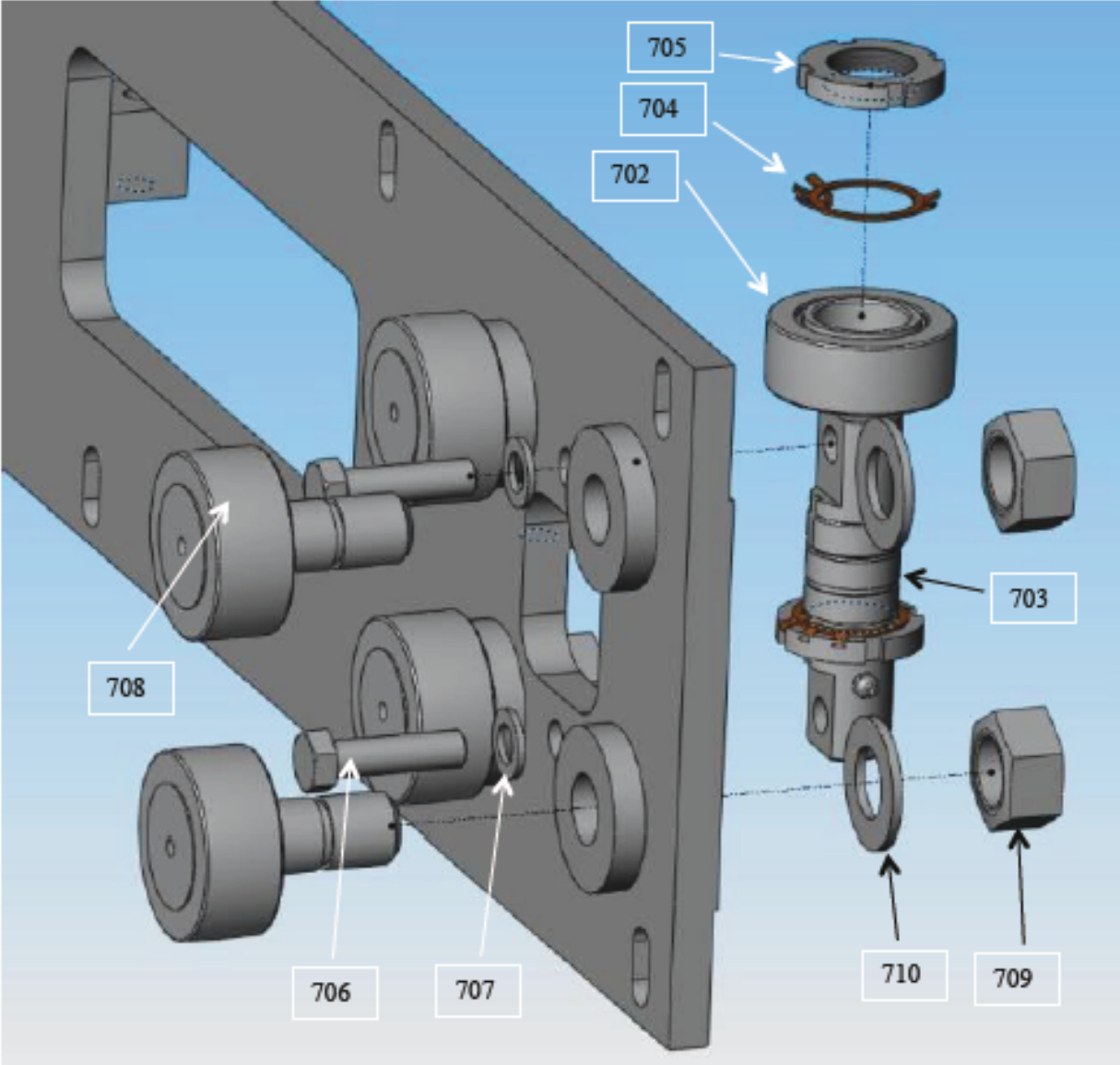
Rotor assembly



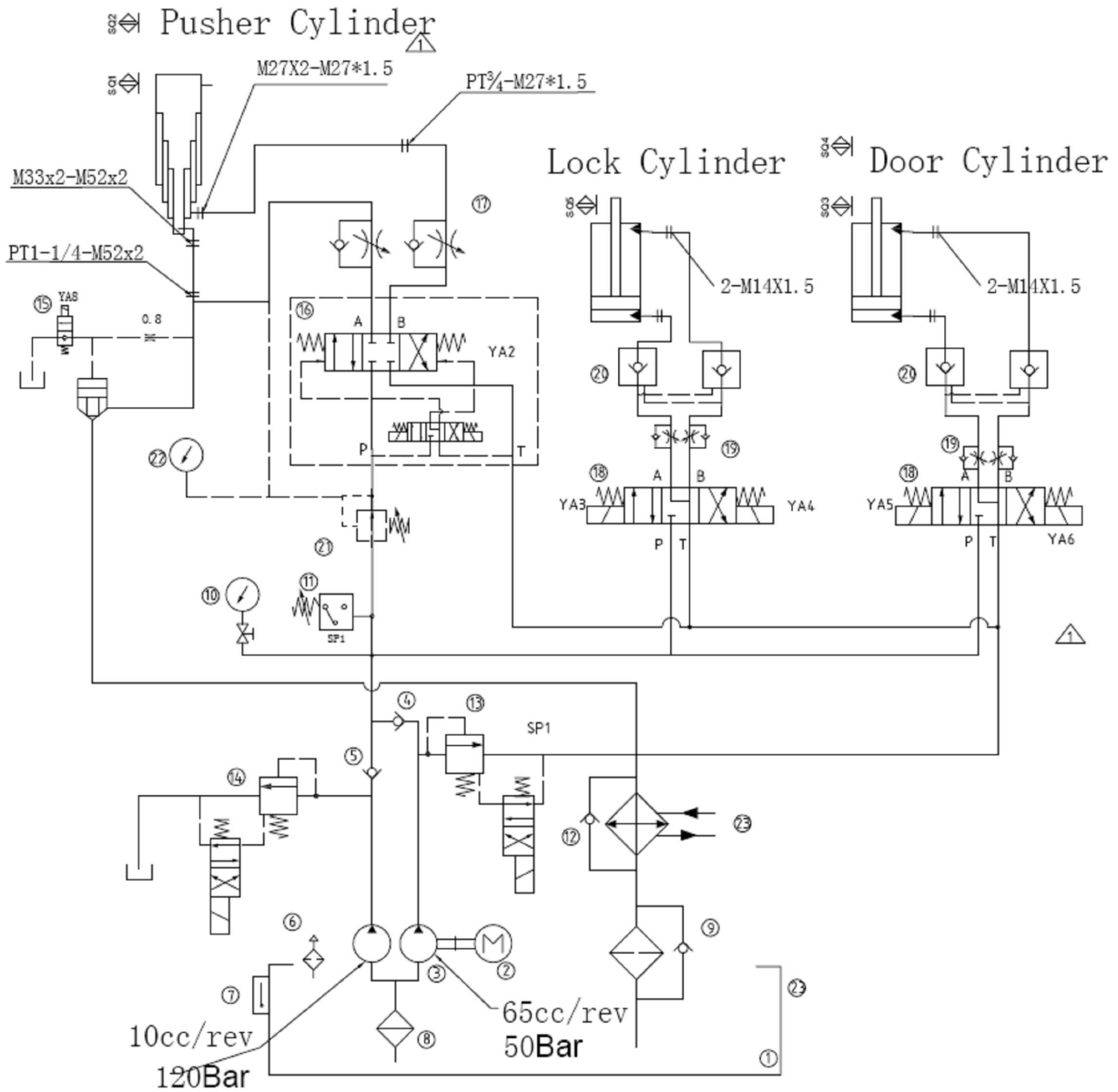
Drive



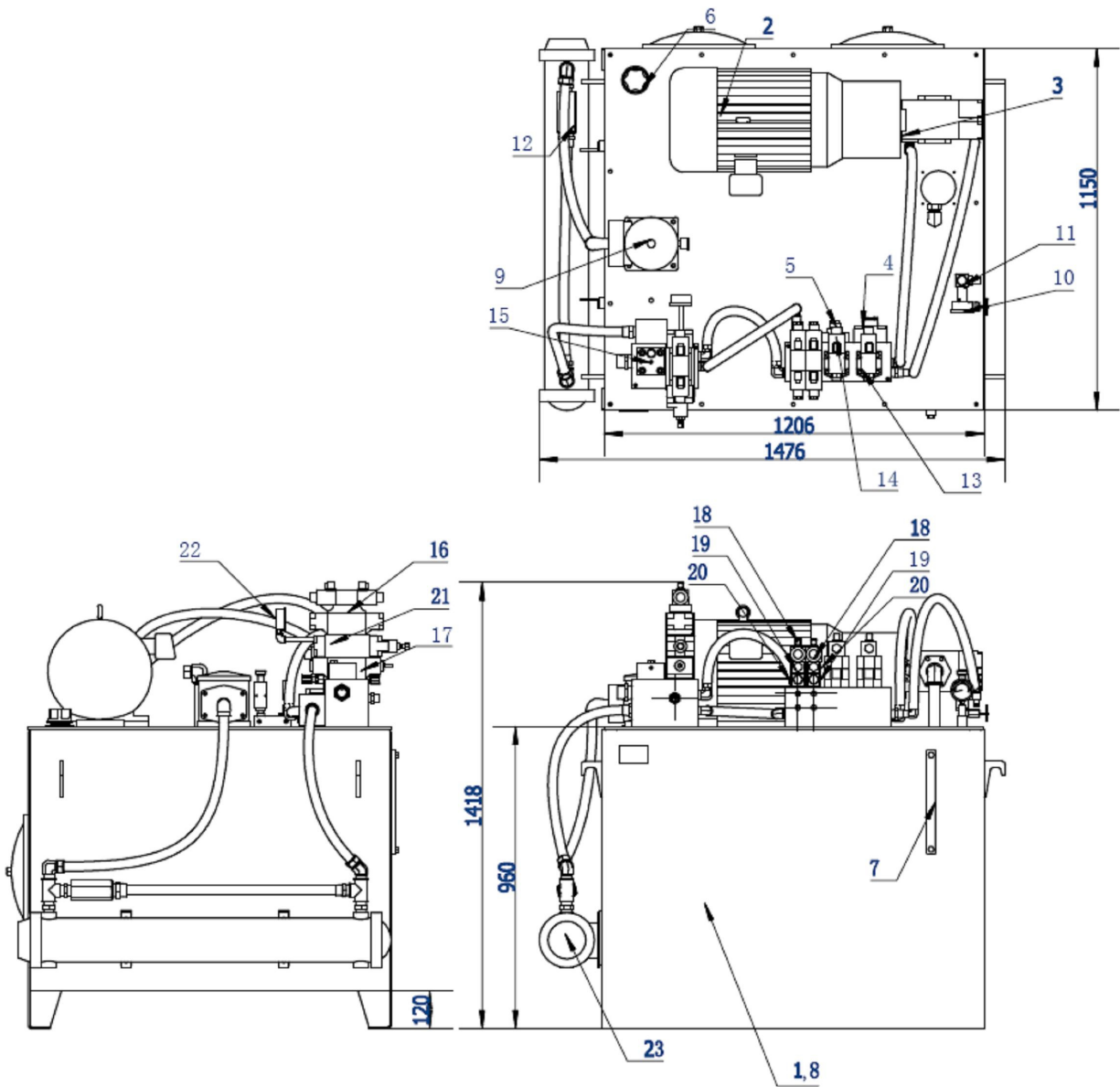
Guidance



Hydraulic Diagram



Hydraulic Pump



7-4 Spare Parts List

Pos.	Pc	Description/Standard	Part number/SAP
100		Machine complete	
101	2	Side cover	ZRS1000-01-06-00
102	1	Lower door	ZRS1000-01-07-00
103	1	Upper door	ZRS1000-01-08-00
104	1	Top cover	ZRS1000-01-09-00
105	1	Scraper top	ZRS1000-01-03
106	12	Anti-vibrating foot	80050273
200	1	Feeding trough	
201	3	Bolt (I) for cylinder for cover	ZRS1000-04-02-00
202	3	Bolt (II) for cylinder for cover	ZRS1000-04-03-00
203	3	Bolt (III) for cylinder for cover	ZRS1000-04-04-00
204	10	Anti-vibrating foot	80050273
205	2	Pneumatic cylinder SI-63x160-S-CB	80040369
206	2	Lock GH72425	
207	2	Bolt (I)	ZRS1500-11-07
208	2	Bolt (II)	ZRS1500-11-08
209	8	Circlip DIN471 – 16	
210	2	Safety grid	ZRS1500-16-00
211	2	Safety bar for cover	ZRS1500-18-00
300	2	Bearing	
301	2	Bearing housing SN236	
302	2	Bearing 22236/W33	
303	3	Bearing Cover A	GSH80120-021-03-
304	1	Bearing Cover B	GSH80120-021-03-
305	0	Bearing Cover C	
306	4	Sealing DIN3760 D200 x 230 x 15	
307	2	Key	
308	2	Distance bush	ZRS1000-06-02
309	32	Fixing bolt DIN912 – M12 x 30 8.8	
310	2	Washer DIN125 – 25	
311	2	Fixing bolt DIN912 – M24 x 70 8.8	
312	2	Spring washer DIN127 – 24	
313	8	Washer DIN125 – A24	
314	8	Fixing bolt DIN912 – M24 x 11- 8.8	
315	8	Spring washer DIN127 – B24	
400	2	Drive 45 kW	
401	2	Motor 45 kW	

402	2	Gear pulley SPC375-4	
403	2	Gear pulley taper bush TB 3535 - 48	80002370
404	2	Key	
405	8	V-Belt SPC3350	
406	2	Motor pulley SPC375-4	
407	2	Motor pulley taper bush TB 3535 - 60	80002350
408	2	Key	
409	2	Pulley cover + support	ZRS1000-15-01-00
410	1	Base frame for motor	ZRS1000-07-01-00
411	1	Gear box SEW MC3PLHF06SD – 14 (i=41)	
	1	Gear box SEW MC3PLHF05SD – 23 (i=41)	
412	2	Torque arm plate	ZRS1000-07-04-01-00
413	8	Bolt DIN933 – M24x140 – 12.9	
414	16	Washer DIN433 – 25 – 300HV	
415	8	Nut DIN934 – M24	
416	2	Torque arm bolt	ZRS1500-07-05
417	40	Disc spring DIN2093 – A71	
418	2	Hard washer	ZRS1000-07-06-04
419	2	Nut DIN934 – M36 – 10	
420	2	Nut DIN935 – M36 – 10	80040180
421	6	Hard washer	ZRS1000-07-06-06
422	2	Fixing bolt	ZRS1500-07-03-00
423	2	Bolt DIN933 – M10x30 – 8.8	
424	2	Washer DIN125 – A10	
425	2	Spring washer DIN127 – 10	
426	2	Distance sleeve	ZRS1000-07-07
427	2	Cover	ZRS1000-07-08
428	2	Bolt DIN933 – M16x45	
429	2	Spring washer DIN127 - 17	
500	1	E-knife rotor 1482x1410	
501	204	Rotor knife 34x34x20	80001002
502	204	Rotor knife fixing Bolt DIN912 – M12x40 – 12.9	80040034
503	204	Washer GB/T1230-12	80040029
504	204	Rotor knife holder	21660700
505	408	Knife holder fixing bolt M8x25 DIN912/12.9	80011090
506	204	Underlay plate t=2	ZRS1500-06-01-05
600	1	Stator knife complete	
601	4	Stator knife 279x80x30	80001202
602	8	Prism fixing Bolt DIN912 – M12x65 – 12.9	
603	8	Bolt for pushing DIN912 – M12x65 – 12.9	80011290
604	8	Bolt for pulling DIN912 – M16x50 – 12.9	
605	8	Knife holder fixing bolt DIN912 – M16x45 – 12.9	80011290
606	4	Knife holder plate	ZRS1500-01-01-03-03
607	4	Prism	ZRS1500-01-01-03-02

Pos.	Pc	Description/Standard	Partnumber/SAP
700	1	Pusher complete	
701	1	Stage cylinder 100x140x180x225-7000	
702	6	Support roller NATV40PPA	
703	6	Shaft for bearing	ZRS1500-05-01-02-01
704	12	Lock washer DIN5406 – MB8	
705	12	Slotted nut DIN981 – KM8	
706	12	Fixing bolt support roller DIN933 – M16 –	
707	12	Washer DIN125 – 16 – 300HV	
708	18	Support roller KR80PPA	
709	18	Nut DIN934 – M30x1.5 – 10	
710	18	Washer DIN125 – 31 – 300HV	
711	3	Scraper	
712	1	Bolt for cylinder	ZRS1500-12-03-00
800		Hydraulic	
801	3	Cylinder for cover 63 x 35 x 280	
802	1	Hydraulic unit SCH-412-00-2 F 15 kW	
803	6	Pipe holder	80050784
804		Connectors	
900		Electrical parts	
901	3	Safety switch AZ15zvrk	
902	5	Small control box	
903	1	Control panel	
904	1	Control cabinet	
905	3	Proximity switch II0297	
906	3	Cable for Proximity switch E10200	
907	1	Laser distance sensor 01D1000	
908	3	Light barrier YM-T10	

7-5 Technical Assistance

Parts and Service Department

The ACS Customer Service Group will provide your company with genuine OEM quality parts manufactured to engineering design specifications, which will maximize your equipment's performance and efficiency. To assist in expediting your phone or fax order, please have the model and serial number of your unit when you contact us. A customer replacement parts list is included in this manual for your convenience. ACS welcomes inquiries on all your parts needs and is dedicated to providing excellent customer service.

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